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Strategies and challenges associated with long-term weight loss maintenance among overweight and obese women in Quebec

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Strategies and challenges associated with long-term weight loss maintenance among overweight and obese women in Quebec

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Résumé

Contexte / Objectif: Le maintien de la perte de poids est essentiel pour la gestion de l'obésité et des maladies chroniques associées. Cette étude vise à identifier les stratégies et les barrières associées à la perte de poids à long terme chez les femmes en surpoids et obèses au Québec.

Méthode: Une étude transversale utilisant un modèle de triangulation simultanée entre les méthodes quantitatives et qualitatives a été utilisée. Pour colliger les données quantitatives et qualitatives, un questionnaire a été administré aux participantes par téléphone par la chercheuse de l'étude et une série de questions ont été envoyées par courriel afin de compléter l'analyse qualitative. Un total de 29 femmes en surpoids ou obèses ayant suivi une intervention de perte de poids avec la diététiste (également la chercheuse de cette étude) ont été incluses. Une perte de poids de 5% maintenue pendant au moins un an a été considérée comme un maintien de perte de poids réussi (n = 15). Sinon, elles étaient classées comme une non-réussite (n = 14) du maintien de la perte de poids.

Résultats: Les participantes ayant maintenues leur poids avaient plus de probabilités d'avoir complété un niveau de scolarité plus élevé et d'avoir perdu plus de poids après le premier mois d'intervention nutritionnelle que les participantes qui avaient repris leur poids. Les stratégies individuelles significativement plus utilisées chez les réussites du maintien de perte de poids comparé aux non-réussites étaient; augmenter la consommation d'aliments non transformés ou peu transformés, limiter la consommation d'aliments ultra-transformés, réduire la taille des portions et faire de l'activité physique (AP) (≥ 40 minutes / jour). Les stratégies environnementales telles que; avoir le soutien d'un réseau social et créer un environnement alimentaire plus sain à la maison étaient légèrement plus rapportées par les réussites de perte de poids. La barrière principale au maintien de la perte de poids était la tentation des aliments pour les personnes qui avaient maintenues leur poids, tandis que pour les participantes classées comme «non-réussite», la pratique de l'AP était leur principale barrière.

Conclusion: Le succès de la perte de poids est complexe, multifactorielle et dépend du contexte. Il n'y a pas de «stratégie unique» pour le succès du maintien de la perte de poids. Une perte de poids à long terme est possible, mais elle nécessite de suivre des principes de

bases telles que de limiter la consommation d'aliments ultra-transformés, augmenter la consommation d'aliments non ou minimalement transformés, cuisiner et réduire les portions, et ces principes doivent être durables. Pour augmenter les chances de réussite du maintien de la perte de poids, les individus et les professionnels de la santé devraient cibler des stratégies en fonction de la compréhension de l'interaction entre les choix individuels et plusieurs dimensions de l'environnement alimentaire qui les déterminent, ainsi que du contexte particulier dans lequel les individus évoluent.

Mots-clés : maintien de la perte de poids, stratégies, barrières, défis, régime alimentaire, environnement, réduction du poids

Abstract

Background/Objective: Weight loss maintenance is crucial for successful management of obesity and its related chronic disease. This study aimed to identify strategies and barriers associated with long-term weight loss among overweight and obese women in Quebec.

Method: This study employed a cross-sectional method using a concurrent triangulation design that uses quantitative and qualitative instruments. To collect the quantitative and qualitative data, a questionnaire was administered to participants over the phone by the researcher and another series of questions were sent by email to participants to complete the qualitative analysis. A total sample of 29 overweight or obese women who had previously completed a weight loss intervention program with a registered dietitian (who is also the researcher of this study) were included. A 5% weight loss maintained for at least one year was considered a successful weight loss maintenance (n=15) and these participants were classified as maintainers. Otherwise, participants were classified as re-gainers (n=14).

Results: Maintainers were more likely to have completed a higher level of education and to have lost more weight after the first month of nutrition intervention when compared to re-gainers. Individual strategies used significantly more within maintainers when compared to re-gainers included: increasing unprocessed or minimally processed food consumption, limiting ultra-processed food consumption, reducing portion sizes, and practicing physical activity (PA) (≥40 minutes/day). Social and environmental strategies such as having a supportive network and creating a healthy food environment at home were reported more by maintainers. The main barrier to weight loss maintenance was food temptation for maintainers whereas practicing PA was the main barrier for re-gainers.

Conclusion: Weight loss success is complex, multifactorial, and context dependent. There is no "one size fits all strategy" for successful weight loss maintenance. Long-term weight loss is possible but requires following basic principles such as limiting ultra-processed foods, increasing whole and minimally processed food, cooking more and reducing portions, and these principles must be sustainable. To increase chances of successful weight loss maintenance, individuals and health professionals should target strategies according to an

understanding of the interaction between individual choices and several dimensions of the food environment influencing these choices.

Keywords: weight loss maintenance, strategies, barriers, challenges, diet, environment, weight reduction.

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To my son to be born Kiyan, who pushed me to complete this thesis before his birth.

To my husband, who is always a great source of motivation.

To my mother, who has always inspired me to be ambitious and successful in life and I've always wanted to make her proud.

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1. Introduction

In the last few decades, a major world wide problem has arisen: the "global epidemic" of obesity. The prevalence of overweight and obesity has dramatically increased both in the developed and developing countries (WHO, 1998). In Canada, the prevalence of obesity (BMI≥30.0) increased from 14.8% in 1989 to 26.7% in 2015 and when added to overweight (BMI≥25.0), the prevalence rose to 61.2% in 2015 (Public Health Agency of Canada, 2011; Statistics Canada, 2018). This increase in obesity is mainly due to deterioration in diet quality as a result of the transformation of our environment into an obesogenic one and decrease in physical activity (PA) (McAllister et al., 2009). Being overweight increases the risks of many chronic diseases (diabetes, high blood pressure, heart disease, etc.) and a number of cancers. Fortunately, losing weight, as little as 5% of body weight, results in a significant reduction in health risks (Institute of Medicine, 1995). More than 90% of type 2 diabetes, 80% of heart disease, and 70% of colon cancers could be prevented through the means of a healthy diet and lifestyle (nonsmoking, healthy weight, moderate PA) (Willett et al., 2006). Interventions combining diet, exercise, and behavioural change strategies show some success but keeping the weight lost in the long-term is a challenge and thus, the weight is often regained (Powell & Calvin, 2007). Findings from a survey conducted in Quebec show that 45% of women make more than two attempts a year to lose weight, and according to another survey conducted in 2008, 73% of women in Quebec want to lose weight which demonstrates the scope of the problem (ASPQ, 2003; Ipsos-Reid, 2008). According to research findings, a maximum of 20% of individuals with excess weight are able to lose at least 5% of their initial body weight and maintain it for at least one year (Wing & Hill, 2001, 2005).

Given the above, increasing the prevalence of successful long-term weight loss (losing at least ≥5% body weight body weight and maintain it for ≥1 year) to decrease the risks of obesity-related chronic diseases is crucial. This can be achieved by having a better understanding of how people can be successful at losing weight over a long period of time, which in turn can be determined by identifying the behavioural and environmental strategies that should be adopted and maintained; ascertaining the perceived and faced barriers of long-term weight loss maintenance and how to cope with them should also be looked at.

2. Review of the literature

Obesity is a complex health issue. Despite this, there is the persistent belief that being obese is the result of individual control and choice (Kirk & Penney, 2010). This may partly explain why society has failed to prevent and manage obesity. The next section will explore a broader approach to obesity management that includes not only the individual but also the environment in which the individual lives.

2.1 Social Ecological Model and obesity

Obesity usually results from the complex interaction of biological and environmental factors. Although our environment usually shapes our behaviour, it is also possible to change our behaviour in a specific environment (Speakman, 2004). According to a social ecological model for understanding obesity, our decisions are influenced by many components (Figure 1) (Story et al., 2008). This multi-level model takes into consideration the individual and its environment and suggests that interventions will be most effective in changing behaviour if they address multiple factors. According to this model, individual knowledge is not enough to create behavioural change; change also requires a supportive environment. The model includes four levels:

- Individual factors including demographics, dietary preferences, lifestyle, knowledge and skills, etc.;
- Social environmental factors which deal with the interaction of individual with family, friends and/or colleagues;
- Physical environmental factors where the individual makes a choice and is influenced by a variety of settings; home, restaurants, supermarkets, worksite, etc.); and
- Macro-level environmental factors including systems (government, health care); businesses and industries (food and beverage, etc.) and policies.

Moreover, this model accounts for the interrelationships among the above named factors to better understand and determine the behaviours that can influence weight gain or loss.

Based on the first three levels of this multi-level model, the next sections will explore the behaviours that need to be adopted to achieve long-term weight loss maintenance. The perceived barriers to weight loss maintenance along with coping strategies will also be discussed. This study will focus on micro-environmental factors only as it is the most immediate environment of the individual, whereas the fourth level (the macro-level environment) will not be covered as it refers the more general environment and is not within the scope of this study.

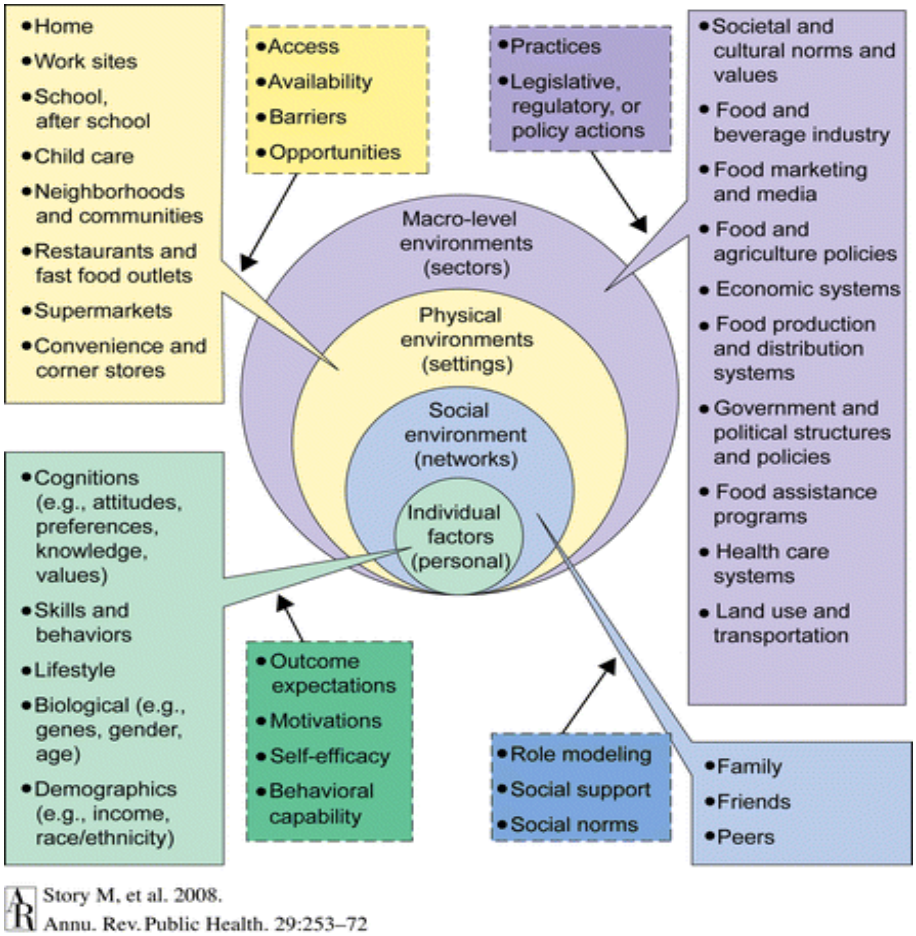


Figure 1. An ecological framework depicting the multiple influences on what people eat.

Unless otherwise indicated, all the studies discussed in this scoping literature review are from the United States of America (US) and participants are both male and female. Most studies looked at weight loss maintenance and were limited to short-term weight loss given the paucity of data available for long-term weight loss maintenance. All the studies looked at

voluntary weight loss achieved through dietary and lifestyle changes except for one study where weight loss was achieved through gastric bypass surgery (Livhits et al., 2010). The present review included the latter as it presented some interesting findings and participants still had to go through lifestyle and dietary changes to be successful at their resultant weight loss.

Many studies and findings discussed in this literature review are from the National Weight Control Registry (NWCR) located in the US. The NWCR was established in 1994 by Rena Wing and James O. Hill for the purposes of studying the characteristics and behaviours of successful weight loss maintainers. It is the largest registry of long-term successful weight loss maintainers to date, with approximately 10,000 participants of whom 80% are women and 20% are men. To be eligible, individuals must have maintained a weight loss of ≥13.6 kg (30 pound) for ≥1 year. Detailed questionnaires and annual follow-up surveys are sent to registry members to study the strategies used to maintain weight loss, as well as to explore behavioural and psychological characteristics. A look at their data shows that on average, registry members lost 30 kg and were able to keep them off for 5.5 years. Weight loss has ranged from 13.6 kg to 136 kg and the duration of the weight loss maintenance ranged from 1 year to 66 years. While some lost weight rapidly, others lost weight very slowly, as much as over 14 years. The research findings of the Portuguese Weight Control Registry (PWCR), a second, but much smaller registry, are also discussed. The PWCR was established in 2008 for similar purposes as the NWCR. It consists of adults who have been successful at losing at least 5 kg and have been able to keep it off for ≥1 year. At the present, 388 individuals (64% women) are enrolled in the registry. The average age and weight of woman in the registry is 45 years old and 145 lbs. Some have lost the weight rapidly, while others have lost weight very slowly.

2.2 Individual-level factors

2.2.1 Demographic characteristics

A study looking at the behavioural factors associated with successful weight loss after gastric bypass surgery found that **single or divorced** individuals appear to be more successful at weight loss than their married counterparts (Livhits et. al, 2010). Similarly, in a study from Croatia aimed at identifying factors predictive of weight loss success and drop-out rate found that being married was a negative predictor of weight loss in a 12 month weight reduction program. This could be explained by the fact that single individuals may have more time for meal preparation or PA (Hadžiabdić et al., 2015). On the other hand, the majority of the participants (all maintainers who maintained the weight loss for ≥1 year) in both the NWCR and the PWCR are married (Thomas et al., 2014; Santos et al., 2017). When looking at education levels, according to a time-use survey, having a lower education is associated with increased obesity (Kolodinsky & Goldstein, 2011). Hadžiabdić et al. (2015) found that subjects with a lower educational level were more likely to drop-out than those with a higher education level. Individuals with a higher education had 3.3 times more chances at completing the 12 months weight loss program. This could be on account that individuals with higher education levels may be able to understand information better. Patients with higher level of obesity rates had a higher tendency to drop-out from weight loss programs (Hadziabdic, 2015). These results are consistent with members of both registries; in the NWCR, 88.1% (n=2542) of members completed a higher education program (some college or more) and 69.1% (n=268) of all registered members in the PWCR completed a university degree.

In another study looking at the predictors of attrition (drop-out) and weight loss success found that a younger age was related to higher risks of attrition (drop-out); however, age did not predict weight loss success (Fabricatore, 2009). Meanwhile, a study measuring psychosocial predictors of weight loss success found that a higher **number of** recent **dieting attempts** was one of the strongest predictors related to lower weight loss (Teizera et al., 2002).

Findings from several studies suggest that larger early weight loss is consistently related to significant long-term reduction (Astrup et al., 2000; Anderson et al., 2001; Brikou et al., 2016; Finer et al., 2006; Jeffery et al., 1998; Ortner et al., 2015; Wadden et al., 1992). Nackers et al. (2010) studied whether slower initial weight loss was associated with greater long-term weight loss maintenance than fast initial loss. Their findings show that fast (≥0.68 kg/week), moderate (≥0.23 and <0.68 kg/week), and slow (<0.23 kg/week) weight losers differed significantly in mean weight changes at six (−13.5, −8.9, and −5.1 kg, $p<0.001$) and 18 months (−10.9, −7.1, and −3.7 kg, $p<0.001$). No significant group differences were found in weight regain between six and 18 months. This suggests that fast initial weight loss is more likely to achieve greater long-term weight results without increasing the risks of weight regain. Similarly, Fabricatore et al. (2009) found that greater early weight loss (i.e. first three weeks) was associated with reduced odds of attrition and greater success at one year weight loss, suggesting that perhaps early success may motivate participation. The amount of weight lost in the first month was also the strongest factor for 12 month weight loss prediction in Ortner's (2015) study. Wadden et al. (2011) found that losing a large amount of weight the first year was the strongest factor of achieving a greater loss at year four. Graham et al. (2014) looked at the weight-loss journey of weight loss maintainers in the NWCR over a 10-year period (n=2886) and found that even though participants with larger initial losses faced slightly faster regain, they maintained significant greater weight reduction over the 10-year follow-up phase.

Overall, there is a very limited amount of studies examining demographic characteristics in relation to long-term weight loss maintenance. The available studies suggest that having a higher education (≥college), being obese at a higher levels or for longer, and achieving a greater early weight loss may increase the chances of being successful at weight loss and weight loss maintenance. Findings for marital status were inconclusive; available studies suggest that being single may increase the chances of losing weight but being married may increase the chances of maintaining the weight in the long term.

2.2.2 Dietary behavioural strategies

One of the key findings of the NWCR is that 78% individuals enrolled in the program reported **eating breakfast** seven days per week. Only 4% reported never eating breakfast.

Similar findings have been shown in the PWCR, where eating breakfast was reported as a strategy used to achieve and maintain weight loss (89.8% and 96.6%) (Santos et al., 2017). A cross-sectional survey of African American women maintainers (maintained ≥ 10 % weight loss for at least one year) conducted by Barnes et al. (2012) found that maintainers (n=301) were more likely to eat breakfast most days of the week as compared to regainers (n=809) (81.8% versus 62.4%, $p<0.001$). These findings are also coherent with other studies done in the US and Greece (Vanderwood et al., 2011; Karfopoulou et al., 2013; Wing et al., 2017). This suggests that including breakfast in one's routine may be a behaviour to adopt to be a successful maintainer. Another study from Greece aimed at investigating the potential associations between breakfast consumption and weight-loss maintenance found that breakfast consumed at home was statistically significantly associated with weight loss maintenance in men only. On the other hand, the study also found that only 36.8% (n=97) of male regainers reported eating breakfast daily. This may indicate that consuming breakfast for regainers may be more of a challenge (Brikou et al., 2016). A study done in Australia by Neve et al. (2011) looked at factors related to successful weight loss maintenance and found that successful weight loss maintainers (losing ≥ 5% of initial weight after 15 months post-enrolment) were less likely to report skipping meals ($p<0.001$) and that skipping any meals (not only breakfast) was related to unsuccessful weight loss maintenance. A study conducted by Jakubowicz et al. (2013) at the University of Jerusalem looked at overweight/obese women on a 12-week hypocaloric diet. Interestingly, their study found significantly higher weight loss in the group consuming more calories at breakfast when compared to the "more calories at dinner" group (-8.7 ± 1.4 vs -3.6 ± 1.5 kg, $p < 0.001$) as well as greater reduction in fasting glucose, insulin, and insulin resistance.

Another strategy consistently reported by the NWCR is the consumption of a **low calorie, low fat diet.** According to Klem et al (1997), 31.1% of women (n=623) and 36.7% of men (n=150) reported limiting their energy from fat as a strategy to lose weight and reported eating 1381 kcal/d, with 24% of calories from fat (calculated from a food frequency questionnaire), which is below the Canadian and American daily recommended amount of 30% fat (Wing & Phelan, 2005). As a strategy to lose weight, maintainers in a Mediterranean qualitative study mentioned limiting "high-fat foods and choosing low-calorie, low-fat foods"

and also turned to low-calorie foods to enhance satiety when hungry (Karfopoulou, 2013). In the PWCR, reducing fatty foods was a strategy to lose weight used by 87.7% of the women and by 88.5% of the men in order to maintain the weight loss (Santos et al., 2017). According to the Barnes et al. (2012) study, maintainers were more likely to limit their fat intake (46.9% versus 34.3 %, $p<0.001$) as compared to regainers. Meanwhile, McGuire et al. (1999) looked at predictors of weight regain in successful weight reduction maintainers from the NWCR and found that higher increases in percentage of calories consumption from fat was associated with greater risks of weight regain. In another study, weight loss maintainers (n=205) stated eating significantly fewer calories at year four than participants who had regained their weight (n=50) (1565.5 kcal versus 1873kcal/day with $p=0.0002$) (Wadden et al., 2011). According to a 10-year observational study of self-reported weight loss and behavior change in 2886 participants in the NWCR by Graham (2014), increasing the percentage of energy intake from fat would result in greater weight regain.

Restricting certain food was one of the most common dietary strategies to losing weight used by NWCR members. According to the study, 87.6% of participants used this strategy (Wing & Phelan, 2005); however, it was not reported if this strategy was used to maintain weight loss thereafter. Epiphaniou and Ogden (2010) studied ten women successful at long-term weight loss maintenance (≥ 10% weight loss and maintained for ≥1 year) and found that for the majority, before and during weight loss, many daily living aspects were described as limited and restricted including dietary habits. On the other hand, subsequent to weight loss maintenance, participants described a shift in identity from a formerly restricted individual (including dietary habits) towards one who was liberated. This would mean that dietary restriction is essential for initial weight loss to be achieved but that for longer weight loss maintenance, diets can become less restricted and more flexible. For example, one participant mentioned “So we have our little treats, I have had biscuits, I’ve counted them into my themes … I don’t feel deprived of anything. If I want a chocolate, I can have it. You just count it.” Previously controlled and restricted eating was replaced with a more liberated self-approach to eating which resulted in feeling fulfilled rather than deprived. **Flexible control of eating** as a maintenance contributing factor is also supported by the German Lean Habits Study, one of the world’s largest prospective cohort studies on the association between

behaviour and successful long-term weight loss. The study investigated nearly 7000 subjects with regard to behaviour and weight reduction and 1247 participants were followed for three years (Westenhoefer et al., 2004). Subjects who maintained behavioral changes such as choosing low-fat food, having a flexible control over eating behaviour and coping with stress by the end of the first year had a higher probability of successful weight reduction after 3 years. The percentage of successful weight reduction also increased with the number of behavioural scores for which improvement was maintained and was highest in subjects who maintained five to eight behavioural improvements.

Diet consistency, defined as maintaining the same diet throughout weekdays and weekends (all year round), was also evaluated by the NWCR. Non-consistency was defined as being stricter during weekdays and more flexible on weekends. Results indicated that "participants who reported a consistent diet were 1.5 times more likely to maintain their weight within 5 pounds over the subsequent year than participants who dieted more strictly on weekdays" (Gorin et al. 2004). The NWRC also found that individuals who allowed themselves more flexibility on holidays instead of being consistent throughout the year had greater risk of weight regain. Furthermore, the Lean Habits Study found that rigid control of eating, a dichotomous "all or nothing" approach, where periods of strict restrictions (totally avoiding certain foods such as sweets or other favourite foods) alternated with periods without any diet control efforts was not associated with a significantly higher probability of successful weight reduction maintenance (Westenhoefer et al., 2004). Restrictions are associated with greater risk of binge eating (the consumption of large quantities of food in a short period of time), hence dieting more strictly on weekdays and allowing for flexibility in the diet on weekends may increase exposure to high-risk situations, creating more opening for loss of control (Racine et al., 2011). It was often reported by regainers that the feeling of deprivation during dieting ended when the target weight was achieved and thus, the perception that previous eating habits could resume followed (Karfopoulou, 2013). The NWCR reported similar findings; regainers reported decreases in levels of dietary restraint. In contrast, this may suggest that individuals who are able to maintain a consistent diet regimen across the week and year may not feel or experience restrictions as much since their diet may be more of a lifestyle rather than a weekday only diet.

Reducing and regulating sugary foods consumption including desserts, sugar sweetened beverages, and sugar modified foods was one of the main dietary strategies emphasized by maintainers of a qualitative study looking at the behaviours associated with weight loss maintenance and non-maintenance in a Mediterranean population sample (Karfopoulou et al., 2013). According to Neve et al. (2011), maintainers were less likely to report drinking soft drinks when compared to regainers (p=0.004). Similarly, successful women maintainers were more likely to report reducing sugary foods as a weight loss maintenance strategy (p=0.004), and it was, in fact, reported by 86.9% of females in the PWCR study (Santos, 2017). According to a case-control study, compared to a normal weight group, weight loss maintainers (WLM) reported consuming three times more daily servings of **artificially sweetened soft drinks** (0.91 vs. 0.37; p = .003). In this study, WLM (N = 172) had maintained ≥ 10% weight loss for 11.5 year, and had a BMI of 22.0 kg/m^2 (Phelan et al. 2009). A meta-analysis studying body weight and non-caloric sweetened beverages show that results reported in different scientific publications are contradictory, some study show a positive association between the consumption of non-nutritive sweeteners, energy intake and body weight, while others show that the consumption of these additives in replacement of sugar sweetened beverage may lead to a reduction in caloric intake and body weight. However, the higher quality of evidence (randomised controlled trials (RCT), systematic reviews and meta-analyses of RCTs) shows that consumption of non-nutritive sweeteners in substitution of sugars could be useful to reduce calorie intake and body weight (Cavagnari, 2019).

Reducing portion sizes was another popular strategy used by 68.9% of the PWCR women maintainers and it was also one of the main diet-related approaches used in the Karfopoulou et al. (2013) study. According to the Styles Survey, a higher proportion of successful maintainers (n=543) vs regainers (n=1415) reported measuring food portions on their plate (15.89% versus 6.73%) (Kruger et al., 2006). In a subsequent study by the same authors, it was found that participants who mentioned being very confident in their ability to eat smaller amounts at each meal had adjusted odds at successfully maintaining their weight loss that were 229% higher than those who stated being not confident (Kruger et al., 2008). **Counting calories** was another strategy reportedly used to lose weight among 43% of the

participants in the NWCR study; however, it was not mentioned if this strategy was maintained by successful maintainers. According to Kruger et al. (2006), counting calories was a strategy tried by both successful (19.75%) and unsuccessful (18.34%) weight losers but a significantly higher proportion of successful weight loss maintainers reported tracking calories (17.73% versus 8.84%) most days of the week. Counting calories was used as a strategy to lose weight by 20.9% of the women and to maintain the weight lost, by 14.3% of the women in the PWCR (Santos et al., 2017).

Increasing vegetables and fruit consumption was also a strategy more often stated among successful maintainers versus regainers. It was found that female participants (n=639) who consumed more than five portions of fruits and vegetables per day had adjusted odds of successfully maintaining weight loss at 60% higher than female (n=426) who stated being not confident (Kruger et al., 2008). In the PWCR, consuming vegetables was a strategy used by 90.9 and 89.3% of the female participants to achieve weight loss and weight maintenance. The majority of maintainers in the Karfopoulou (2013) study reported making efforts to increase vegetables (or salads) and fruit intake. A higher proportion of maintainers ate ≥ five portions of vegetables ($p=0.009$) and ≥ two portions of fruits daily ($p=0.026$) as compared to non-maintainers (Neve et al., 2011). Participants in the Lean Habit Study mentioned opting for more fruits and vegetables while trying to avoid sweets and fatty foods.

Another strategy found was **organizing and planning meals**. To maintain healthy eating, maintainers mentioned that organizing and planning meals in advance was a useful strategy (Karfopoulou et al., 2013). Likewise, significantly more maintainers versus regainers reported that they planned their meals on most days of the week (35.9% versus 24.9%, $p <0.001$) (Kruger et al., 2006). To lose weight and to maintain the weight loss, maintainers reported increasing their eating frequency. The amount of meals eaten, however, was not mentioned (Karfopoulou et al., 2013). In the NWCR, most participants reported eating nearly five meals per day (Klem et al., 1997).

Putting an emphasis on home cooked meals was reported by maintainers as a strategy to losing and maintain weight, whereas the time and effort required for **cooking** was perceived as a barrier to losing weight by regainers (Karfopoulou, 2013). Findings by Kruger et al.

(2006) showed that **cooking/baking for fun** was a common strategy used by successful weight loss maintainers. According to Kolodinsk & Goldsteing (2011), cooking at home has a mitigating effect on Body Mass Index (BMI) and cooking time is associated with a decrease in BMI. This could likely be due to the use of more whole and minimally processed foods in cooking and/or to having smaller portions as compared to prepared meals or meals from a restaurant.

Other strategies that were the most frequently reported for weight loss maintenance found in the PWCR were **increasing fiber-rich foods consumption** (e.g., whole cereals or bread) reported by 83.6% of all members and 81.9% of female members, **incorporating healthy snacks** in-between meals (80.8% all members and 84.1% of all females), and **selecting food consciously** (e.g., reading food labels) mentioned by 72.7% of all members and 75.7% of female registers.

Another aspect that has not yet been studied in weight loss maintenance is the role of **food processing**. Recently, the number of studies linking food processing and health has been emerging. Monteiro (2008) argues that food processing is driving the emergence of the obesity pandemic and other nutrition-related chronic non-communicable disease: “the issue is not food, nor nutrients, so much as processing”. Monteiro et. al (2016) classified foods and drinks in terms of their nature, degree, and purpose of processing. They classified foods into four categories: natural or minimally processed foods, processed culinary ingredients, processed foods, and ultra-processed foods. Several other studies have demonstrated a clear link between diet quality and processed foods. In Canada, the caloric share of ultra-processed products in household food purchases rose consistently from 24.4% in 1938/1939 to 54.9% in 2001 (Figure 2). Moubarac et. al (2016) found that diets in Canada based on ultra-processed foods were grossly nutritionally inferior to diets based on unprocessed or minimally processed foods and freshly prepared dishes and meals made from these foods plus culinary ingredients and processed foods. Another study found similar results (Martinez et al., 2017). The link between obesity and food processing is emerging. Mendonça et al. (2016) found that the consumption of ultra-processed foods was associated with higher overweight and obesity risk in a prospective cohort of Spanish middle-aged adult university graduates. Cross-sectional studies undertaken in Brazil and in Canada also linked ultra-processed food consumption to obesity

(Canella et al., 2014; Louzada et al., 2015; Moubarac, 2017). Researchers have proposed that the dietary share of ultra-processed products can predict many problematic aspects of modern diets: the excess of sugar, sodium and saturated fats, excess in calories, low intake of fiber, vitamins and minerals; low satiety and high glycemic index, as well as effects of microbiome (Monteiro 2018).

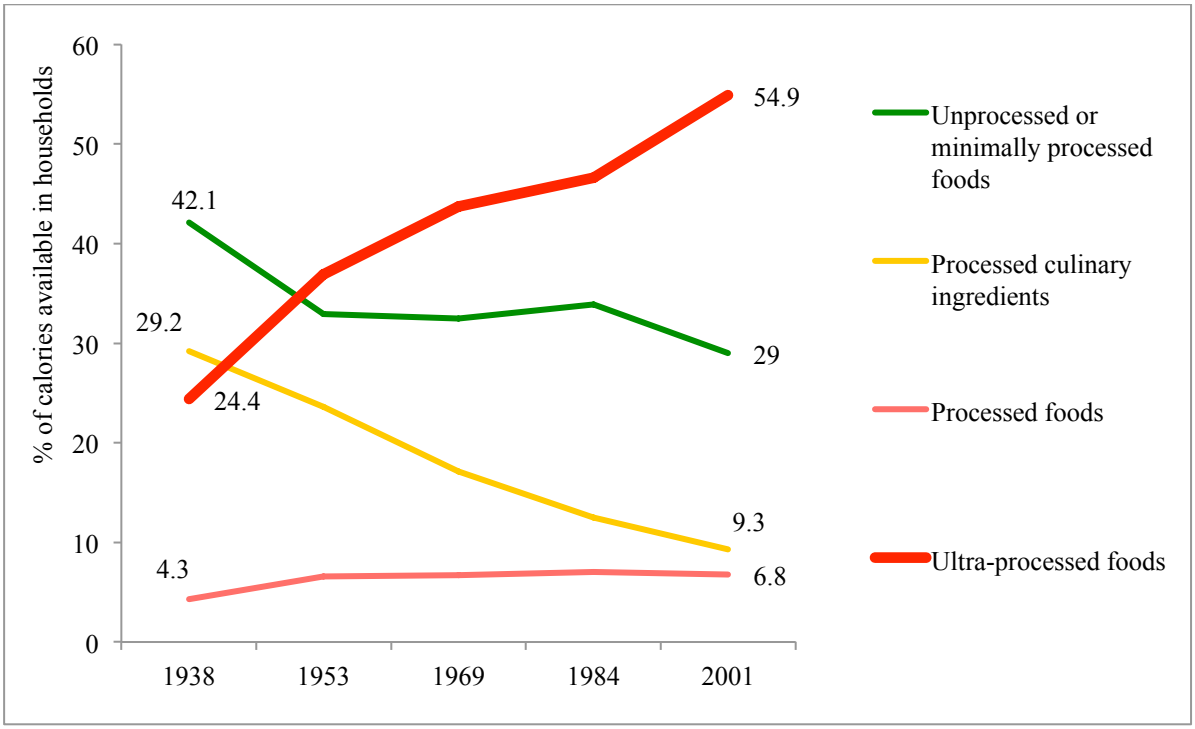


Figure 2. Trends over time for changes in the household food share of three groups of foods from 1938 to 2001 in Canada.(Moubarac, JC., 2014).

The number of dietary patterns available is innumerable, from low carbohydrate, low fat to Mediterranean, Paleolithic, mixed balanced and vegan. However, these diets are often promoted by claiming that they are the best diet to adopt to either lose weight or for optimal health. Interestingly, the strong focus placed on reducing dietary fat has failed to address the obesity and diabetes crisis, and in fact, has exacerbated the crisis due to an increased consumption of high starchy and sugary foods. The original guidance of low-fat food consumption would have been intended to encourage consumption of unprocessed or minimally processed foods, more specifically, plant foods, rather than highly processed, fat-

reduced foods (Katz and Miller, 2014). According to Katz and Miller (2014), if diet denotes a very specific set of rigid principles, it is impossible to say which diet is best for health. However, if diet signifies a more general dietary pattern, we can easily determine which diet is the best for health. After comparing numerous diets, the authors found key shared elements compatible between all the types of diets named above: "(a) diets comprising preferentially minimally processed foods direct from nature and food made up of such ingredients, (b) diets comprising mostly plants, and (c) diets in which animal foods are themselves the products, directly or ultimately, of pure plant foods" (Figure 3). This suggests that **limiting ultra-processed foods**, **promoting whole or minimally processed foods** and **limiting quantity** may be great dietary strategies to adopt to achieve and maintain weight loss on top of staying healthy.

	Low-carbohydrate	Low-fat/ vegetarian/vegan	Low-glycemic	Mediterranean	Mixed/balanced	Paleolithic
Health benefits relate to:	Emphasis on restriction of refined starches and added sugars in particular.	Emphasis on plant foods direct from nature; avoidance of harmful fats.	Restriction of starches, added sugars; high fiber intake.	Foods direct from nature; mostly plants; emphasis on healthful oils, notably monounsaturates.	Minimization of highly processed, energy-dense foods; emphasis on wholesome foods in moderate quantities.	Minimization of processed foods. Emphasis on natural plant foods and lean meats.
Compatible elements:	Limited refined starches, added sugars, processed foods; limited intake of certain fats; emphasis on whole plant foods, with or without lean meats, fish, poultry, seafood.					
And all potentially consistent with:	**Food, not too much, mostly plants[a,b,c].**					

[a]From Reference 135.
[b]Portion control may be facilitated by choosing better-quality foods which have the tendency to promote satiety with fewer calories.
[c]While neither the low-carbohydrate nor Paleolithic diet need be "mostly plants," both can be.

Figure 3. Common elements of different dietary patterns (Katz & Meller, 2014).

In summary, eating breakfast every day, consuming a low-calorie, low-fat diet, flexibility in control of eating, being consistent with eating throughout the year, reducing portion sizes and sugary foods, tracking calories, increasing vegetables and fruit consumption, organizing and planning meals in advance, incorporating healthy snacks in between meals, selecting food consciously (e.g., read food labels), and cooking/baking for fun are all strategies more likely used by maintainers as compared to regainers. Based on Katz & Meller's (2014) study, in simpler terms, all these dietary strategies could be translated into limiting ultra-processed foods, promoting whole or minimally processed foods, and reducing quantities consumed.

2.2.3 Lifestyle and self-monitoring strategies

PA is the number one strategy used among NWCR members and the most consistently reported strategy used among maintainers in most research findings. Women in the registry reported spending an average of one hour/day of moderate-intensity activity. The most stated activity was walking, reported by 76% of the participants and approximately 20% reported weight lifting (Wing & Hill, 2005). In the PWCR, 78% of participants engaged in levels of moderate plus-vigorous PA exceeding 150 min/week (Santos et al., 2017). According to Kruger et al. (2006), exercising for ≥30 minutes daily ($p=0.003$) or adding a PA to their daily routine ($p<0.001$) was significantly higher in maintainers versus regainers. Kruger et al. (2008) found that women who engaged in more than 150 minutes of PA per week were more likely to maintain weight loss then sedentary women. In a systematic review, it was found that PA was included in 88% of successful weight loss interventions (Ramage, 2013). In another study by Ogden (2014), those with the highest PA at registry entry were found to have lost the most weight but also that they perceived weight loss maintenance to be more difficult and required the use of more strategies as compared to those in the lowest PA category. Those in the lowest PA category also maintained weight loss despite lower levels of PA. It was also found that those reporting an **exercise** barrier such as being too tired or having no time were 48 to 76% less likely to be successful at maintaining the weight lost than those reporting no exercise barriers (Kruger, 2006). Vanderwood et al. (2011) looked at factors associated with a weight loss maintenance goal (7% weight loss) at follow-up among participants who completed an adapted diabetes prevention program (DPP) and found that maintainers were more likely to engage in high levels of PA (≥150 min per week) than non-achievers. Their study also found that regainers were more likely to state exercise as a barrier compared to those achieving and maintaining the weight loss goal. Similarly, being unable to find time for exercise (47%) was one of the most mentioned reasons for weight regain (Barnes, 2012).

According to Raynor et al. (2006), weight loss maintainers spend less time **watching television** (10 hours or less per week). Based on two databases searches (PubMed and Google Scholar), this study is the only one to compare television watching to weight loss in maintainers versus regainers. According to WHO, physical inactivity can double the risk of

obesity and cardiovascular disease (WHO, 2002). Watching more television increases our sitting time, which in turn can lead to more physical inactivity.

When comparing maintainers versus regainers, surprisingly, one strategy was consistently reported: **self-monitoring of weight**. Butryn et al. (2007) studied the relationship between self-weighing and weight loss maintenance and the characteristics related with frequent self-weighing. Participants of the study were members of the NWCR (n=3003), more frequent weighing was found to be associated with shorter duration of weight loss maintenance, larger cognitive restraint, greater disinhibition, and greater fat intake. Weight change from baseline to one year follow-up was not significant for those who didn't change their weighing frequency; however, weight gain at one year follow-up was significantly higher ($p< 0.001$) for participants whose self-weighing frequency had decreased as compared with those whose frequency had increased or remained the same. Furthermore, participants whose self-weighing frequency had decreased were more likely to report increases in their percentage of caloric intake from fat, decreases in cognitive restraint, and increases in disinhibition. Frequent self-weighing may allow people to catch dietary slips before they worsen and turn into larger weight gain. Interestingly, frequent self-weighing (≥weekly) was also associated with shorter duration of weight loss maintenance, meaning that people who maintain their weight loss for a longer period of time (≥ 5 years) may be able to control their weight or behaviour without depending on the scale. On the other side, regainers also weighed themselves less frequently than maintainers. This could be to due the fact that it may be harder to catch warning signs of weight gain if there is no self-weighing, making it harder to adopt lifestyle or dietary actions to prevent larger weight gain. At the same time, it is also probable that individuals gaining weight prefer to avoid the scale as doing so may be stressful and discouraging. This study by Butryn et al. (2007) suggests that **consistent self-weighing** is a strategy that can be used to maintain weight loss, whereas a decrease in self-weighing frequency may increase the risks of weight regain. Similarly, Barnes & Kimbro (2012) found that regainers were more likely to report "weighing themselves less than once a month" (47.3 % versus 30.2 %, $p<0.001$). Vanderwood et al. (2011) also found that participants who monitored their weight on a regular basis were more likely to maintain their weight than regainers ($p=0.01$). These findings are consistent with other studies (McGuire et al., 1999;

Wing & Hill, 2001, 2005; Chambers & Swanson, 2012; Karfopoulou et al., 2013; Graham et al., 2014; Santos et al., 2017).

Recording dietary intake has also been associated with significantly higher levels of weight loss. Fabricatore et al. (2009) found that "each additional day of food recording during the first three weeks of treatment was associated with a 7% increase in the odds of attaining at least a 5% weight loss at 1 year" (p. 6). This literature review did not locate any studies linking recording dietary intake with long term maintenance.

It is fair to conclude that most maintainers use more than one strategy to maintain their weight loss. More interestingly, however, according to the NWCR, 89% of participants reported using both diet and PA for weight loss and only 10% stated using diet only and 1% using exercise only (Wing, 2005). Thus, the above literature review would suggest that practicing PA (≥30 minutes/ day or ≥150 minutes/ week) of moderate-intensity such as brisk walking and consistent monitoring weight seems like promising strategies to adopt to maintain weight loss. It is unclear whether recording dietary intake can help maintain weight loss and there are not enough findings to confirm that spending less time watching TV is related to weight loss maintenance. However, it has been consistently demonstrated that watching TV is associated with increased risks of obesity (Ghose, 2017). Meanwhile, there seems to be a correlation between weight gain and reporting no exercise or **exercise** as a weight control barrier, as well as a decrease in self-weighing frequency.

2.2.4 Psychosocial behavioural strategies

A systematic review of qualitative research on weight loss maintenance from the United Kingdom (UK) found that **intrinsic motivation** may be particularly important for weight loss maintenance as the enjoyment and satisfaction in lifestyle behaviours can reinforce weight control maintenance. Maintainers also often mentioned having a growing sense of **confidence and self-esteem** (Greaves et al., 2017). Participants in the NWCR were asked to report whether weight loss had resulted in improvement, no change, or worsening in various aspects of their life. The study found that over 90% of successful weight loss maintainers reported improvement in overall quality of life, general mood level, self-confidence, and energy levels.

Greater baseline **depressive** symptoms were associated with increased probabilities of attrition (Fabricatore, 2009). Many studies report weight maintenance as associated with **less depressive symptoms, disinhibition and increased dietary restraint** (McGuire et al., 1999; Wing et al., 2001, 2006, 2007, 2008). In the NWCR, all participants completed the Center for Epidemiologic Studies Depression Scale (CES-D); the average reported by all registry members was similar to that of a non-depressed community control group. On the other hand, higher levels of depression and disinhibition were associated with weight regain in the registry (Wing & Hill, 2001). Participants who had fewer problems with **disinhibition** were 60% more likely to maintain their weight over one year. Similar findings were found for depression, with lower levels of depression related to greater odds of success (Fabricatore et al., 2009).

Emotional eating is a common barrier for weight loss maintenance reported by both maintainers and regainers. In Karfopoulou et al.'s (2013) study, although emotional eating was reported as a barrier to weight loss maintenance, maintainers compensated by eating less or exercising more the next day, while regainers did not mention any coping strategies. Stress and emotional eating was considered the main reason for weight regain. Non-successful maintainers also mentioned that emotional eating was the main cause of weight regain. According to Vanderwood et al. (2011), the same barrier was reported by 48% of maintainers versus 71% of regainers in their study. Another study assessed emotional eating with the Three Factor Eating questionnaire and found that for each one point increase on the emotional eating scale, the probability of being successful decreased by 16% (Neve, 2011).

Being able to cope with **stress** increases the odd ratios of being successful at weight reduction after three years by 31% according to the Lean Habits Study (Westenhoefer, 2004). Stress was a common barrier mentioned by regainers (68%) as compared to maintainers (49%) in the study (Westenhoefer, 2004). Similarly, quotes such as "when I was going through a rough time, a stressful period, something, and it was a bit emotional, then I'd want something to eat" or "when I get mad, when I'm upset, and when I'm stressed, I eat" were reported by regainers (Karfopoulou, 2013, p. 11). Additionally, eating due to stress (53%) was one of the most mentioned reasons for weight regain in the study by Barnes (2012).

In conclusion, the above data would suggest that finding intrinsic motivation, being confident, and having a higher self-esteem is associated with weight-loss maintenance. Having

higher levels of depression, disinhibition, and dietary restraint increases the risks of weight regain. Emotional eating and stress are two main barriers related to weight loss maintenance, as they are also associated with gain weight in general.

2.3 Social environmental factors

In a study using individual (IC) (n=129) versus conference (CC) (n=128) calls delivered by a primary care provider (PCP) staff compared the outcome of weight loss over two years. The intervention was adapted from the DPP, delivered over the phone, and included a 16-session core curriculum in year one (including goal-setting, self-monitoring, diet/activity modification, and problem-solving), a 12-session continued telephone contact program in year two, plus ongoing telephone coaching sessions (by dietitians). The program hypothesized that group support would promote greater weight loss. Indeed, after two years, the CC intervention resulted in an average weight loss of 6.2 kg (CC) versus 2.2 kg (IC) and 52.2% (CC) and 28.6% (IC) lost ≥5 % of initial weight. The greater results in the CC group may as a result of the group dynamic and support as in CC intra-group discussion was encouraged (Weinstock et al., 2013).

Social pressure (mostly family) to lose weight was also reported as a barrier to losing and maintaining weight (Karfopoulou, 2013). According to Karfopoulou (2013), for successful long weight maintenance, new habits (dietary or lifestyle) should be reinforced by social support. Similarly, Kruger et al. (2006) also found that social support was associated with successful weight maintenance. In a retrospective study looking at the behavioural factors associated with weight loss after bariatric surgery, it was found that **support group** meetings were associated with successful weight loss. Social support may improve weight loss after surgery by helping patients to cope with lifestyle and dietary changes and other stressors (Livhits et al., 2010).

Unfortunately, not many studies have looked at the relationship between social support and weight loss maintenance; the few studies available, however, do seem to suggest that social support is an important factor contributing to weight loss maintenance, while social pressure, lack of support, and negative support can be associated with weight regain.

2.4 Physical environmental factors

Keeping healthy foods available at home (e.g., fruit, vegetables) and **avoiding keeping "high-fat or high-calories snacks"** were other dietary strategies used to reach and maintain weight loss. Successful weight loss maintainers were less likely to keep snack food in the house when compared to unsuccessful weight maintenance and this behavioural strategy was also found to be independently associated with successful weight reduction maintainers (Neve et al., 2011). One of the most reported behaviours for both weight loss and weight reduction maintenance was having healthy foods available at home and used as a strategy by 92.7% of the weight loss participants and 96.7% of the weight maintainers (Santos et al., 2017). According to the 2004 Styles survey, participants who mentioned being very confident in their ability to keep fewer high-fat, high-calorie snacks at home adjusted odds of successfully maintaining weight loss at 57% higher than those who stated being not confident (Kruger et al., 2008). This strategy was also used to achieve weight loss by 93.0% of the women and by 97.6% of women maintainers in the PWCR. **Easy access to "high calorie snacks"** (sweets or calorie-rich snacks) was also a barrier often reported by maintainers in the qualitative study by Karfopoulou (2013) but they coped with this barrier by "by having a small portion, completely avoiding 'temptations', choosing healthier alternatives, or spending more time outside the house". This would also suggest that availability of snack foods within a house environment may negatively affect weight loss maintenance.

According to Lin & Frazao (1997), the nutritional quality of food in restaurants is significantly poorer than in home cooked food. Restaurant food has more sodium, total fat, saturated fat, and less fiber. Portions served in fast-food restaurants are often two to five times larger than the standard portion size from the Food Guide Pyramid (Young & Nestle, 2002). Therefore, it is rational to conclude that frequency of visits to restaurants can be positively associated with weight gain. One main finding by Kruger et al. (2008) is that individuals who reported **eating at fast-food restaurant two times or less per week** were more successful at weight loss maintenance. Others studies have found the same results (Barnes et al., 2012; Santos et al., 2014). As previously mentioned, successful maintainers in the NWCR reported consuming 2.5 meals/week in non-fast-food restaurants and 0.74 meals/week in fast food establishments. Thus, someone can still be successful at maintaining weight loss while

enjoying meals at a restaurant about once a week. It is important to propose that the type of restaurant and meal consumed are also important factors (minimally processed foods versus ultra-processed foods). Likewise, those who mentioned dietary barriers such as "eating away from home too often" or "health food consumption not satisfying" were between 48 and 64% less likely to be successful weight maintainers (Kruger et al., 2006). Going out to eat with friends was a challenge for both regainers and maintainers; however, maintainers mentioned opting for healthier or smaller portions or limiting the carbohydrate intake (bread, fries, etc.) or deciding to refrain from eating or simply bringing their own food to cope (Kruger et al., 2006). The most common barrier during maintenance was the **external influence to eat**. Maintainers mentioned "self regulating the frequency and the amount eaten, distracting themselves from the food cues, and choosing low-calorie foods instead" as strategies to cope with this influence (Karfopoulou et al., 2013). The study by Kruger et al. (2008) examining dining-out behaviors of maintainers found that those reporting not eating in fast-food restaurants had adjusted odds of successfully maintaining weight loss 62% higher than those who ate fast-food two times or more per week. Also, those who never ate at a non fast-food restaurant or who never brought home prepared food from the supermarket were more likely to be successful weight loss maintainers than those reporting eating in non fast-food restaurants or bringing home prepared food two times or more per week. Similar results were found in the Neve et al. (2011) study: maintainers were less likely to report eating unhealthy takeaway food than regainers ($p<0.001$).

According to Karfopoulou et al. (2013), **work** was sometimes also a barrier to maintaining weight loss. To cope with work conflicts, maintainers took home-prepared food to work or ate a small snack (Karfopoulou, 2013).

The above findings suggest that availability and easy access to snack foods within the home environment may negatively affect weight loss maintenance, whereas availability of healthy foods at home may favour weight reduction maintenance. Reducing takeaway food and eating out at restaurants or bringing home prepared food from the supermarket increases the likelihood of weight loss maintenance. If work interferes with healthy eating, it is important to cope by either taking home prepared food to work or eating a snack.

In summary, the variety of strategies used to maintain weight loss suggest that there is no "one size fits all" approach to weight loss and maintenance. Most maintainers in all studies used more than one strategy to keep the weight off and according to Vanderwood et al. (2011), "participants achieving the weight loss goal or maintaining their weight loss were approximately two times more likely to report using five or more weight maintenance behaviors (59%) compared to nonachievers (34%)". Although most studies show that more than one strategy should be used at once for successful weight loss maintenance, most studies focused on interventions at the individual level only and only a few looked at the social and physical levels. Nonetheless, findings show that long-term weight loss is a complex process of behavioural changes influenced by more than just one factor. This review found that strategies within both the individual (demographics, dietary choices, lifestyle, psychosocial behaviours and self-monitoring strategies), social (family, friends, peers), and physical (restaurants, home and work) environment should be used to increase the likelihood of successful weight loss maintenance. The macro-level environmental (food and beverage industry, national dietary guidelines etc.) level was beyond the scope of this study. It would appear that the probability of long-term weight loss success increases with the number of behavioural changes (Westenhoefer, 2004). Thus, many behaviour changes are necessary to achieve successful weight reduction maintenance; a single change usually is not sufficient. A change at both the individual and environmental level is a much more promising path.

3. Problematic

Despite numerous efforts to reduce obesity rates, no country to date has succeeded in reversing this epidemic (Mitchell et al., 2011). Substantial research has been focused towards better understanding of obesity and treatment for it (Mitchell et al., 2011). Interventions combining diet, exercise, and behavioural change aimed at reducing weight show some success but the weight lost is typically regained within a few years (Powell & Calvin, 2007). As previously discussed, losing weight—as little as 5% of body weight—can considerably reduce the health risks associated with obesity such as type 2 diabetes, dyslipidemia, coronary artery disease, sleep apnea, non-alcoholic fatty liver disease, and several types of cancer (Wing et al., 2011). Long-term weight loss maintenance is a major, yet elusive goal for many individuals (Stevens et al., 2006). Achieving maintenance of at least a minimum weight loss is essential to reduce the prevalence of obesity and related chronic diseases. Understanding and determining the strategies and barriers associated with long-term weight loss is a key element for health professionals and the individuals looking to improve successful long-term weight loss maintenance, while also being helpful in guiding interventions and policies.

There is a lot of research data on weight loss maintenance achieved through different diet interventions and the behavioural strategies used. However, at the present, no studies have looked at weight loss maintenance using the social-ecological multi-level model to link individual and environmental strategies associated with successful weight loss maintenance (Story et al., 2008). Also, most studies that attempted to understand the factors associated with successful weight loss maintenance are based in the US and countries other than Canada, with none in Quebec. These limitations indicate the need to explore the strategies and barriers associated with successful weight loss maintenance amongst women living in Quebec. Strategies and barriers to weight loss can be different between women and men. According to Kruger et al. 2008, individual behavioural strategies differed between women and men. For example, women were more likely than men to reduce fried foods and sweets (Wilson & James, 2018). In Quebec, 34% of men versus 53% of women said they wanted to lose weight (Venne et Mongeau, 2008) although more men (60.3%) than women (44.0%) are overweight or obese (MSSS, 2018). At At the clinical level, women are more likely to consult a nutritionist to lose weight than men. For these reasons, we have chosen to focus on women in

our study given the role of gender on weight loss and the importance of weight loss for women.

3.1 Objectives

The **main objective** of this research is to identify strategies and barriers associated with long-term weight loss among overweight women in Quebec in order to help health professionals such as dietitians to develop and guide individuals in successful long-term weight loss maintenance interventions.

The **main objective** of this research is to identify strategies and barriers associated with successful long-term weight loss among overweight women in Quebec. According to the Institute of Medicine, maintenance of weight loss is defined as a loss of at least 5% of body weight or a reduction in body mass index (BMI) of at least one unit, and to maintain this weight loss for at least a year (Institute of Medicine, 1995). To determine these strategies and barriers, we will compare the different strategies and barriers used between women who were successful at losing weight long-term (≥5% weight loss from their initial body weight and maintained ≥1 year) versus those who were not successful at maintaining their weight loss (regained most of their initial weight loss to weigh no less than 95% of their initial weight within 1 year). Ultimately, the aim of this study is to develop effective nutrition and lifestyle interventions for successful and sustainable weight loss maintenance. Interventions should be developed by nutritionists and/or a multidisciplinary team of health professionals. The hypothesis of this study is that for the success of a long-term weight loss, several individual and environmental strategies should be used, and these strategies must be sustainable to maintain the weight lost in the long term.

The **specific objectives** are:

- To identify strategies associated to weight loss maintenance experienced by maintainers;
- To identify the significant differences associated with weight loss maintenance between maintainers and regainers and;

- To identify perceived barriers to weight loss maintenance experienced by maintainers and regainers and strategies to cope with the barriers.

4. Methodology

This study used a cross-sectional design with a concurrent triangulation method that employs quantitative and qualitative instruments in order to identify, describe, and compare the different strategies and perceived barriers to long-term weight loss maintenance by weight loss maintainers and regainers. Qualitative and quantitative data were collected simultaneously. The qualitative component of this study was used to confirm/validate the results obtained after quantitative analysis.

4.1 Nutrition intervention

All the participants were previous clients of the main researcher of this study who is also a Registered Dietitian. The participants originally consulted the dietitian (researcher of this study) between 2013 and 2016 through her private practice to adopt healthier eating habits with the intention of losing weight. These consultations were always done over the telephone and documentation was sent by email or post. General guidelines given by the dietitian throughout the sessions were:

- Aim for a balanced and healthy plate (Make ½ of your plate vegetables and fruits , ¼ of your plate whole grains and ¼ plate protein sources, figure 3);

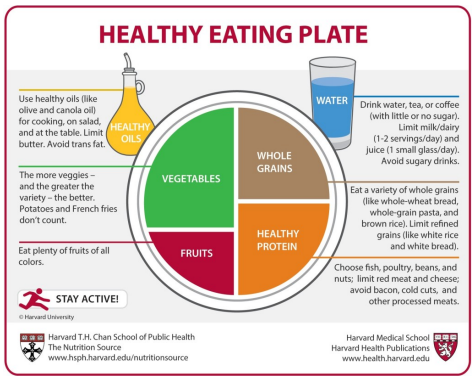


Figure 4. Healthy Eating Plate, Harvard, https://www.hsph.harvard.edu/nutritionsource/healthy-eating-plate/

- Adjust portion sizes; adjusted from Canada's Food Guide 2007 (CFG) using the handy guide made by EatRight Ontario and requirements calculated from their basal metabolic rate (BMR) using the Institute of Medicine equation;
- Eat at regular times;
- Consume three meals a day (breakfast, lunch, and dinner);
- Incorporate balanced snacks in-between meals if you feel hungry and have a large gap between two meals (usually >5 hours): snack examples adjusted from Dietitians of Canada;
- Be active; recommendations based on WHO such as doing at least 150 minutes of moderate-intensity aerobic PA (30 minutes/ day) throughout the week such as brisk walking;
- Limit consumption of ultra-processed foods (packaged food with multiple additives or with unknown ingredients);
- Favour whole foods and minimally processed foods;
- Drink plenty of water (about 2L for women);
- Limit alcohol intake to 1-2 drinks per week for women and;
- Eat slowly and listen to your hunger and fullness signals.

Participants learned how to:

- Read food labels, including how to demystify the list of ingredients and;
- Manage food cravings.

And finally, participants were encouraged to:

- Weigh themselves maximum on a weekly basis (except for eating disorder clients, if any) and;
- Fill in a food diary on a daily basis and include water intake and portions.

4.2 Participants and recruitment

Participants were recruited from the researcher's database of previous clients in her private practice for weight loss. The database included an Excel spreadsheet with all the contact information of clients followed in her private practice for weight loss. Women aged 18 years or over that were followed for weight loss from 2013 to 2016 were classified as potential participants (n=108). All the participants in the study included clients who had received three to nine individual telephone consultations of 30 to 60 minutes each with the dietitian; however, almost all clients were eligible for up to nine sessions paid by their employer. Most consultations were held once every two weeks. From that list, clients that were overweight (BMI≥25kg/m2) at the start of the intervention and that had lost at least 5% of their initial weight by the end of the intervention (which lasted roughly 3 months) were selected (Wing & Hill, 2001, 2005). Pregnant women or women that had given birth since the intervention or those with health issues that could impact their current weight (including some medications, medical conditions, and anorexia) were excluded from the study (Figure 5). Participants were recruited by telephone and were contacted in order of seniority. The research objective of the study was briefly described to them by the researcher. Some potential participants were not able to be reached because they did not answer or return the call. Two participants refused to participate in the study stating they had no time.

Thirty individuals agreed to participate in the study. Participants who had lost more than 5% of their initial body weight and who had maintained it for at least one year were classified as maintainers, the others were classified as regainers (weighing no less than 95% of their starting weight) (Soeliman & Azadbakht, 2014). Using these criteria, an equal number of individuals were identified as regainers (n=15) and maintainers (n=15). Once participants agreed to be part of the study, all the information and the consent form were sent by email or post to the participants. A date and time for the administration of the questionnaire was set once the verbal approval to participate in the study was given. One regainer was excluded from the study as she was absent at the scheduled interview for the administration of the questionnaire.

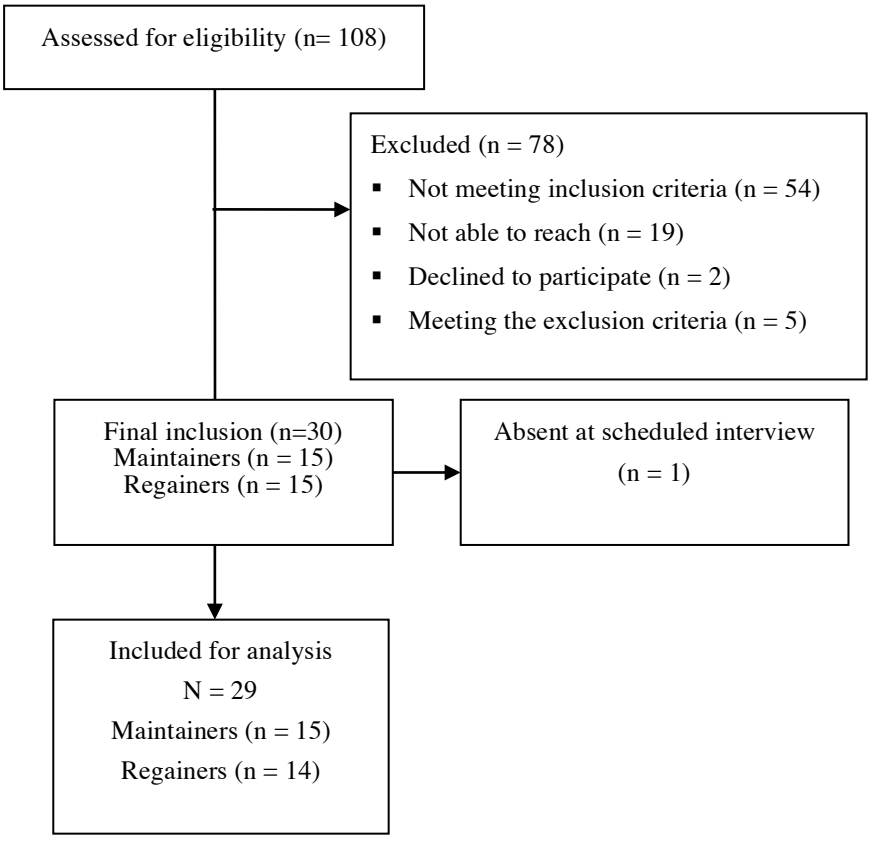


Figure 5. Flow chart of the number of participants included in the study.

4.3 Questionnaires and data collection

Data collection included a quantitative and a qualitative component (Figure 5). All the questions were originally devised and asked in French. The questions and answers were translated in English for the memoire. The quantitative section was made up of a questionnaire (Annex 1) developed by the researcher and informed by her professional clinical experience and the literature review on strategies and challenges associated to weight-loss maintenance. Questions covered several topics including demographic characteristics, weight and diet history, number of nutrition intervention sessions attended, dietary behaviours, lifestyle and self-monitoring, social environment, psychological factors, nutrition knowledge, well-being, culinary skills, confidence and motivation to lose weight, perceived weight loss, and weight loss maintenance barriers. Questions regarding levels of education, marital status, weight loss in the first month, breakfast consumption, frequency of fast-food consumption, practicing PA, employment status, previous attempts to lose weight, meal timing, food quality (consuming less processed foods and more whole/ minimally processed foods), PA, weight monitoring, screen time, barriers to weight loss and well-being were taken from the literature review. Questions about the number of meals per day, consumption of: snacks in between meals; restaurant frequency; ready-to-eat meals; portions of vegetables and fruits per day; cold cuts; whole grains; type of fat used in cooking; fried foods; sweet and sweet beverage; alcohol; salt used for cooking and while eating and food labels were inspired from the lifestyle questionnaire from the Institute de recherche clinique de Montréal (IRCM, 2008). Questions about weight history, snacking in the evening, taking lunch to work, place of consumption, cooking habits, food and social environment, and confidence and motivation were inspired from the researcher's clinical experience. The questions from the literature review and the IRCM come from validated studies, while the questions developed from the researcher's experience were verified by her director, and tested in a small sample (n=5) to evaluate their legibility and understanding. The questionnaire was administered by telephone in one-to-one interviews and consisted of approximately 100 dichotomous, multiple choice questions on a Likert scale and each interview lasted between 45 to 60 minutes. The answers were transcribed by the researcher and interviews were not recorded. The large number of questions

included in the questionnaire is justified by the exploratory nature of the research questions due to the paucity of data in the literature.

The qualitative component consisted of two parts. The first part included five short questions designed to identify and describe strategies and perceived barriers associated with weight loss and weight loss maintenance. These questions were part of the interview questionnaire. Of these five questions, one was addressed to both maintainers and regainers, three to maintainers only, and one to regainers; these questions were designed to confirm findings from the quantitative questionnaire.

The second part (Annex 2) of the qualitative component was also developed to cross-validate or corroborate findings from the quantitative questionnaire and included four open-ended questions to cover four topics of strategies related to weight loss maintenance informed by the review of the literature. These were: 1) dietary purchases, 2) dietary consumption, 3) culinary skills, and 4) food environment. The questions were sent by email or post to participants so as to give them more time to reflect on their answers and the questions were sent prior to the telephone administration of the quantitative/qualitative questionnaire. This part of the questionnaire required that they describe the changes they made since the beginning of their weight loss journey until the day they received the questionnaire.

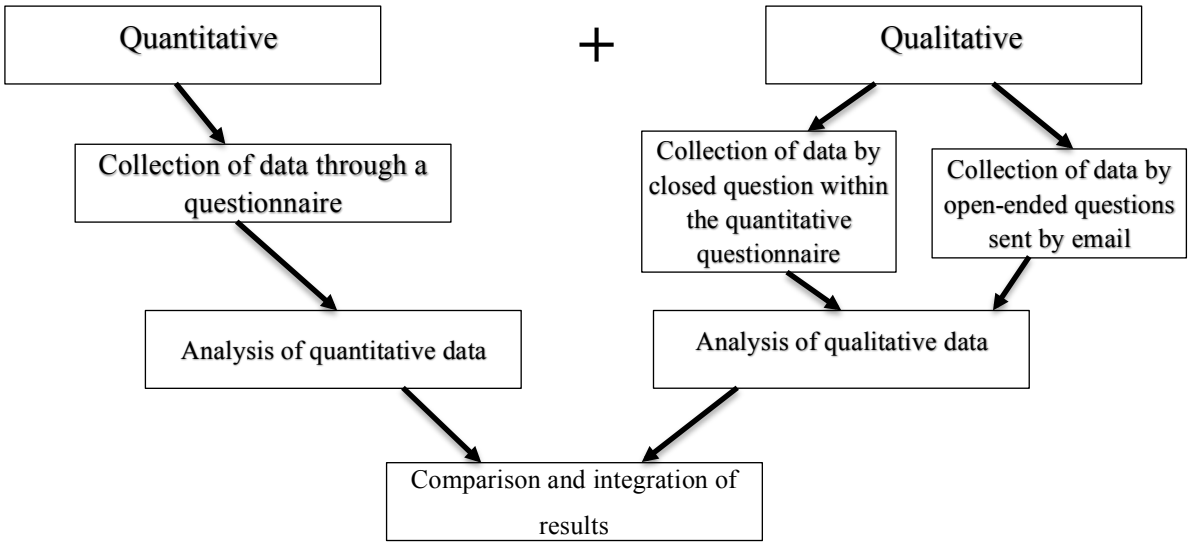


Figure 6. Flow diagram to illustrate the qualitative and quantitative methodologies.

4.4 Data analysis

Quantitative data from the questionnaire were analysed using SPSS Statistics Version 25, 2017/2018. Independent-Samples t Test, Pearson chi-square, and Fisher's exact test were used to identify significant differences between maintainers and regainers for all variables. Normal Independent-Sample t Test was used for continuous or interval variables to compare means between groups (e.g., age, BMI at baseline and at follow-up, total percentage weight loss of initial weight at follow-up, confidence and motivation level, etc.). Normality tests were performed on all continuous and interval variables using Shapiro-Wilk test and a p value of 0.01. Variables not normally distributed were transformed into ordinal variables, these variables include minutes of PA per week, confidence, motivation, and importance of reaching objectives and the number of nutrition sessions attended during the intervention. Categories for each variable were created. Pearson chi-square test was used for ordinal or nominal variables with more than two categories of responses (e.g., education level, marital and employment status, and some dietary behaviour variables, lifestyle behaviours, etc.). Lastly, Fisher's exact test was used for nominal variables with two categories only (yes/no, etc.) (Nayak & Hazra, 2011). Significance level was set at $p<0.05$ for all tests.

For the qualitative data, answers were analyzed using exploratory content analysis (Bernard & Ryan, 2010). All the answers were organized by questions and separated into two groups to compare maintainers and regainers. The main researcher, who collected the data, read the transcripts several times to identify themes associated with strategies and barriers related to weight loss maintenance. Quotes relating to different themes were identified, highlighted with a colour associated with said theme, and extracted and placed under the appropriate category (Annex 3). Bernard and Ryan (2010) describe this method as finding quotes that seem important and organizing them into categories of similar characteristics. The list of themes that emerged as a result of this analysis was then discussed and refined by the main researcher and her supervisor until a consensus was reached. Both the researcher and supervisor read all the text. Then, the number of quotes per theme was calculated for maintainers and regainers to identify differences. To clarify some categories and to help the main researcher and her supervisor validate the placement of each quote and any possible omissions, a codification system was developed and included a definition for each category

(theme), inclusion and/or exclusion criteria, and examples (Annex 4). The same procedure was applied for the short answer questions sent by email but since the answers to each question were shorter here, the themes that emerged from these quotes did not need to be defined.

To validate the findings of the quantitative analysis, data from the qualitative component was used to confirm/contradict, and deepen the results from the quantitative component.

4.5 Ethics

The research protocol for this project was approved by the Comité d'éthique de la recherche en santé (CERES) (approval number 17-046-CERES-D) at the University of Montreal. The ethics approval form is attached (Annex 5).

A consent and informative form (Annex 6) was sent by email or post prior to the interview and was returned to the researcher by email or post. The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013). Participants did not receive any compensation to participate in the study.

5. Results

A total of 29 women were included in the study and all responded to the questionnaire administered by the researcher over the phone. All participants were aged between 28 and 65 years old and had a starting BMI of ≥25.1 before the intervention. The majority of participant of the study were married (76%) and were employed full-time (90%). A total of 52% (n=15) of participants maintained more than 5% weight loss for at least one year and 48% (n=14) had regained their weight at the time of this study and these were identified as "regainers". The average weight loss of the maintainers at the time of follow-up was 12.1kg (weight loss calculated since the start of the intervention), whereas regainers had gained 3.2kg at the time of this study and this was calculated since the start of the intervention. There was also a significant difference in the BMI at the end of the intervention between the two groups. The weight loss maintenance duration since the end of the intervention ranged from 12 months to 42 months with an average of 20 months.

There was no significant difference between maintainers and regainers in age (47.4 versus 46.2 years old), BMI at baseline, overweight onset age, marital status, employment status, family history of obesity, and in previous attempts to lose weight through dieting. At the time of follow-up, the mean participant BMI was 26.0 for maintainers and 33.4 for regainers. Maintainers were more likely to have completed a higher education level (university degree), and to have lost more weight after the first month of nutritional intervention when compared to regainers.

Table 1 Characteristics of maintainers and regainers

	Maintainers Mean (n=15) (SD)	**Regainers Mean (n=14) (SD)**	**p-value***
Age mean (years)	47.4 (10.6)	46.2 (11.8)	0.791
BMI mean at baseline (kg/ m^2)	30.5 (4.9)	32.2 (3.5)	0.291
BMI mean at end of intervention (kg/ m^2)	25.6 (2.7)	29.8 (3.3)	0.001
BMI mean at follow-up (kg/ m^2)	26.0 (3.1)	33.4 (3.9)	<0.001
Total weight loss at follow-up (kg)	-12. 1 (10.5)	+3.2 (3.1)	<0.001
Total percentage loss of initial weight at follow-up (%)	-13.3 (7.1)	+3.7 (3.4)	<0.001
Weight loss mean maintenance since end of intervention (months)	20	N/A	N/A
Overweight onset age (years)	32.3 (14.8)	27.9 (16.8)	0.459
	% (n/N)	**% (n/N)**	**p-value**
Education level			
High school diploma or less	6.7 (1/15)	42.9 (6/14)	0.018
College diploma or equivalent	46.7 (7/15)	50.0 (7/14)	
University degree	46.7 (7/15)	7.1 (1/14)	
Marital Status			
Married or common-law	60.0 (9/15)	92.9 (13/14)	0.081
Separated or divorced (not living in common-law)	26.7 (4/15)	0.0 (0/14)	
Single (not living in common-law)	13.3 (2/15)	7.1 (1/14)	
Employment status			
Full-time worker	86.7 (13/15)	92.9 (13/14)	0.617
Part-time worker	6.7 (1/15)	7.1 (1/14)	
Housewife	6.7 (1/15)	0.0 (0/14)	
Family history of obesity	66.7 (10/15)	85.7 (12/14)	0.390
Previous attempts to lose weight with diet	73.3 (11/15)	64.3 (9/14)	0.700 a
Total weight lost at month 1			
[0-1kg]	0.0 (0/15)	42.9 (6/14)	0.013

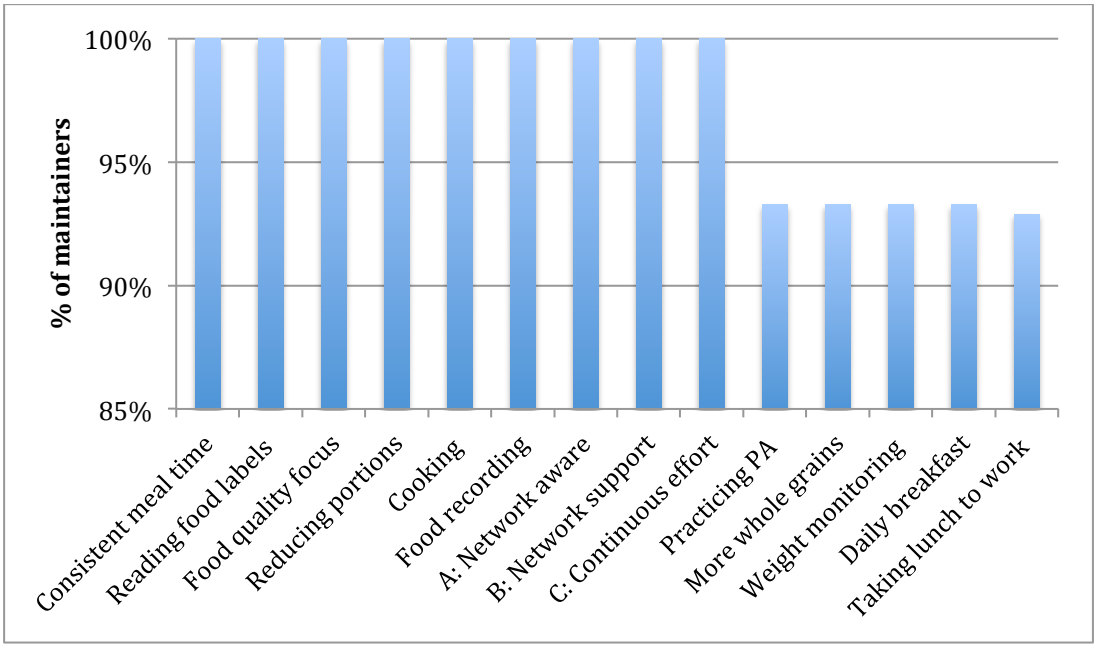
]1-3kg]	26.7 (4/15)	35.7 (5/14)
]3-5kg]	66.7 (10/15)	21.4 (3/14)
]5kg+]	6.7 (1/15)	0.0 (0/14)

*p-value independent-sample t test for between group comparison was used.
a Fisher's Exact Test

5.1 Strategies associated to weight loss maintenance experienced by maintainers

Table 2 demonstrates the most reported strategies for weight loss among maintainers. All of the following strategies were used by more than 85% of maintainers: consistent meal timing, reading food labels, focusing on food quality and quantity, cooking more often, recording food intake, social network (family, friends and/or colleagues) of participant aware that participant is changing her dietary habits, and social network understands and respects her dietary and lifestyle choices, continuous effort to maintain healthy habits, practicing PA, opting for whole grain food majority of the time, weight monitoring, consuming breakfast daily and taking lunch to work.

Table 2 Most reported dietary and lifestyle strategies for weight loss maintenance



A: family, friends and/or colleagues of participant aware that participant is making eating habits changes

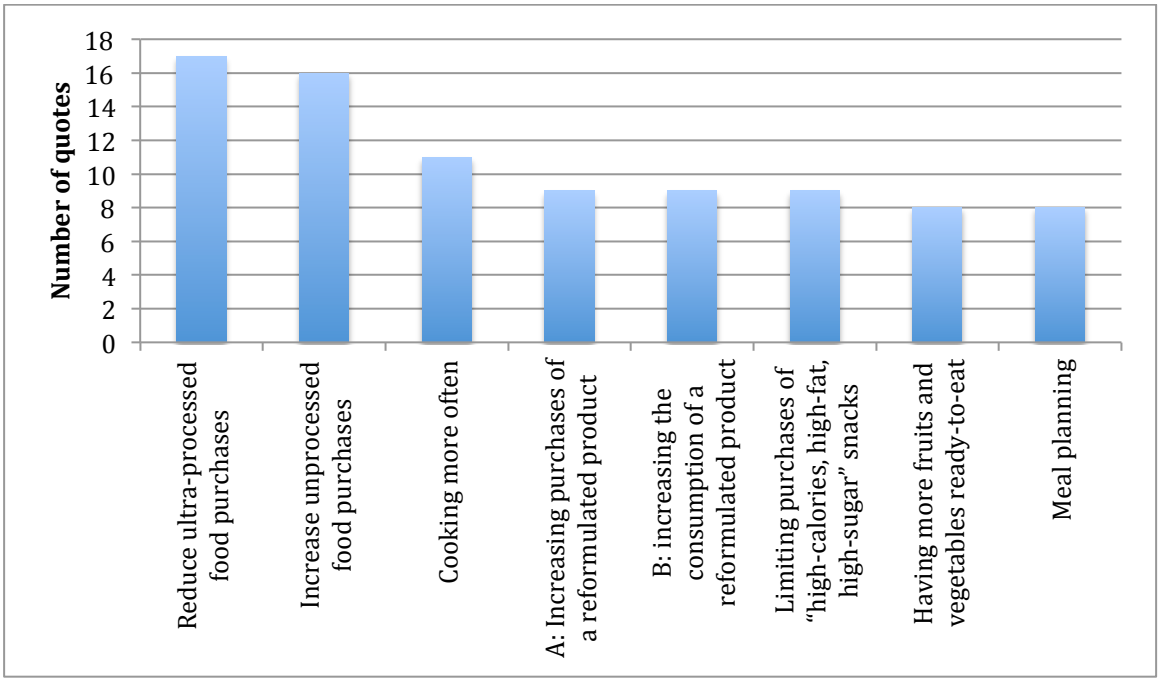
B: family, friends and/or colleagues of participant understand and respect her dietary and lifestyle choices

C: continuous effort to maintain healthy habits

Note: Data reported as percentages. Values correspond to the responses “often” and “always” for each strategy.

Table 3 shows the strategies the most quoted by maintainers. All of the following strategies were quoted at least 8 times: Reduce ultra-processed food purchases, increase unprocessed food purchases, reducing/substituting/increasing purchases of a reformulated product at the nutrient level, reducing/substituting/increasing the consumption of a reformulated product at the nutrient level, eliminating/limiting purchases of “high-calories, high-fat, high-sugar” savoury snacks, having more fruits and vegetables ready-to-eat and planning meals.

Table 3 Most reported quotes by maintainers



A: Reducing/substituting/increasing purchases of a reformulated product at the nutrient level

B: Reducing/substituting/increasing the consumption of a reformulated product at the nutrient level

When maintainers were asked what was the most useful information they had learned during the intervention, **learning how to read food labels** was by far the most reported useful information identified by maintainers (8/15). All the other elements were stated by one maintainer per category, these included: learning what a balanced snack is, how to substitute

culinary ingredients in recipes (to use less-fat, less-sugar), how to reduce portion size, how to balance a plate, replacing refined grains for whole grains, and filling a food diary.

A total of 19 strategies were identified by maintainers as being the most important strategy to lose and maintain weight. **Practicing PA** was by far the most important strategy reported, mentioned by 66.6% of maintainers (n=10), followed by **nutrition follow-ups** with dietitian, mentioned by 33.3% (n=5). Reducing portion size, motivation, support from friends or coworkers and increasing vegetable consumption were also mentioned by a few maintainers. Eleven other strategies were each stated by one or two maintainers: being stress-free, having time, health challenges at work, taking a lunch to work, stopping short-term diets, feeling full, reducing consumption of high-fat products, preparing vegetables in advance, food diary recording, blood sugar control, and weight monitoring.

In summary, the most reported dietary strategies can be summed up to cooking often, reducing quantities consumed, limiting ultra-processed foods and promoting whole or minimally processed foods. The lifestyle and monitoring strategies are practicing PA, weight monitoring and recording food intake. The social strategies are to make sure to be surrounded by a social network who understand and respect the individuals dietary and lifestyle choice. Finally, creating a healthy food environment with more vegetables and fruits ready to eat is the most reported environmental strategy used by maintainers.

5.2 Significant differences associated with weight loss maintenance between maintainers and regainers.

Table 4 shows the similarities and differences between maintainers and regainers in terms of **behavioural strategies for dietary changes**. Maintainers were more likely to read food labels (100% versus 57.1%) and monitor food quality and quantity as compared to regainers. Maintainers were significantly more likely to choose whole grain products than regainers but there was no significant differences found in choosing refined grain products. Most maintainers (80.0%) also reported to never or rarely eat their emotions, whereas the

majority of regainers (92.7%) reported eating their emotions often or always. Maintainers consumed significantly more fruits and vegetables than participants who regained their weight. Maintainers were marginally less likely to eat at fast-food and traditional restaurants than regainers and marginally more likely to plan meals ahead, however, the relationship was found insignificant based on a p-value of 0.05.

No significant differences were found in the number of meals eaten per day, daily breakfast consumption, taking time to eat meals and eating meals at regular times. No significant differences were found between the two groups in either the frequency of consuming various types of ultra-processed foods (ready to eat meals, sweet dessert, bakery items and consuming sweet items). Maintainers were significantly less likely to consume non-carbonated sweet beverages than regainers.

Table 4 Dietary behavioural strategies among maintainers and regainers

	Maintainers (n=15)	**Regainers (n=14)**	**p-value***
Meals per day (average)	**3**	**2.75**	**0.106**
	Maintainers % (n/N)	**Regainers % (n/N)**	**p-value[a]**
Consume breakfast everyday			
Never/Rarely	6.7 (1/15)	0.0 (0/14)	1.000
Often/Always	93.3 (14/15)	100.0 (14/14)	
Taking lunch to work			
Never/Rarely	7.1 (1/14)	7.1 (1/14)	1.000
Often/Always	92.9 (13/14)	92.9 (13/14)	
Taking time needed to eat meals			
Never/Rarely	13.3 (2/15)	35.7 (5/14)	0.215
Often/Always	86.7 (13/15)	64.3 (9/14)	
Consistent meal timing			
Never/ Rarely	0.0 (0/15)	21.4 (3/14)	0.100
Often/ Always	100.0 (15/15)	78.6 (11/14)	
Choosing refined grain products			
Never/ Rarely	80.0 (12/15)	50.0 (7/14)	0.128
Often/ Always	20.0 (3/15)	50.0 (7/14)	
Choosing whole grain products			
Never/Rarely	6.7 (1/15)	50.0 (7/14)	0.014
Often/Always	93.3 (14/15)	50.0 (7/14)	
Reading food labels			
Never/Rarely	0.0 (0/15)	42.9 (6/14)	0.006
Often/Always	100.0 (15/15)	57.1 (8/14)	

Food quality			
Never/Rarely	0.0 (0/15)	35.7 (5/14)	
Often/Always	100.0 (15/15)	64.3 (9/14)	0.017
Reducing food quantity consumption			
Never/Rarely	0.0 (0/15)	42.9 (6/14)	0.006
Often/Always	100.0 (15/15)	57.1 (8/14)	
Meal planning			
Never/ Rarely	33.3 (5/15)	71.4 (10/14)	0.066
Often/ Always	66.7 (10/15)	28.6 (4/14)	
Fast-food frequency			
<1/15 days	100.0 (15/15)	71.4 (10/14)	0.083 b
One to few times/ week	0.0 (0/15)	21.4 (3/14)	
Everyday	0.0 (0/15)	7.1 (1/14)	
Traditional restaurant frequency			
<1/15 days	93.3 (14/15)	64.3 (9/14)	0.080 b
One to few times/week	6.7 (1/15)	35.7 (5/14)	
Everyday	0.0 (0/15)	0.0 (0/14)	
Ready-to-eat meal frequency			
<1/15 days	100.0 (15/15)	92.9 (13/14)	0.483 b
One to few times/week	0.0 (0/15)	7.1 (1/14)	
Everyday	0.0 (0/15)	0.0 (0/14)	
Sweet consumption			
<1/15 days	73.3 (11/15)	50.0 (7/14)	0.227 b
One to few times/week	26.7 (4/15)	35.7 (5/14)	
Everyday	0.0 (0/0)	14.3 (2/14)	
Portions of fruits & vegetables/day			
≤ 2 portions/day	13.3 (2/15)	57.1 (8/14)	0.024 b
3-6 portions/day	46.7 (7/15)	37.5 (5/14)	
7-12 portions/day	40.0 (6/15)	7.1 (1/14)	
Sweet beverages excluding carbonated beverages			
Zero	80.0 (12/15)	42.9 (6/14)	0.017 b
Zero – 500ml/week	20.0 (3/15)	14.3 (2/14)	
]500ml/ week – 250ml/day]	0.0 (0/15)	42.9 (6/14)	
[250ml/ day<	0.0 (0/15)	0.0 (0/15)	

*Non-hydrogenated

a Fisher's Exact test

b $\chi 2$

Three types of plates emerged from the content analysis of the type of plate described by maintainers and regainers. These were separated based on the CFG food groups as follows:

1. A plate similar to the Eat Well Plate where half of the plate is filled with vegetables, a quarter with grain products, and a quarter with meat and alternatives (Government of Canada, 2016);

2. A plate filled with vegetables and meat and alternatives only; and
3. A plate with meat and alternatives and grain product only (no vegetables).

The majority of maintainers and regainers described a plate similar to the CFG Eat Well Plate, and in terms of portions, most maintainers mentioned having at least one cup of vegetables, on average a 0.5 cup of grain product, and 3-4 oz of meat and alternatives. Regainers stated similarities for their vegetable consumption but most reported consuming grain product closer to one cup in size and their meat and alternatives portion was often up to 6 ounces. Three maintainers described having a plate with vegetables and meat & alternatives only (without any grain products), whereas no regainers described consuming this type of plate. Finally, three regainers mentioned having the third type of plate with grain product (>1 cup), 3-4 oz of meat and no vegetables.

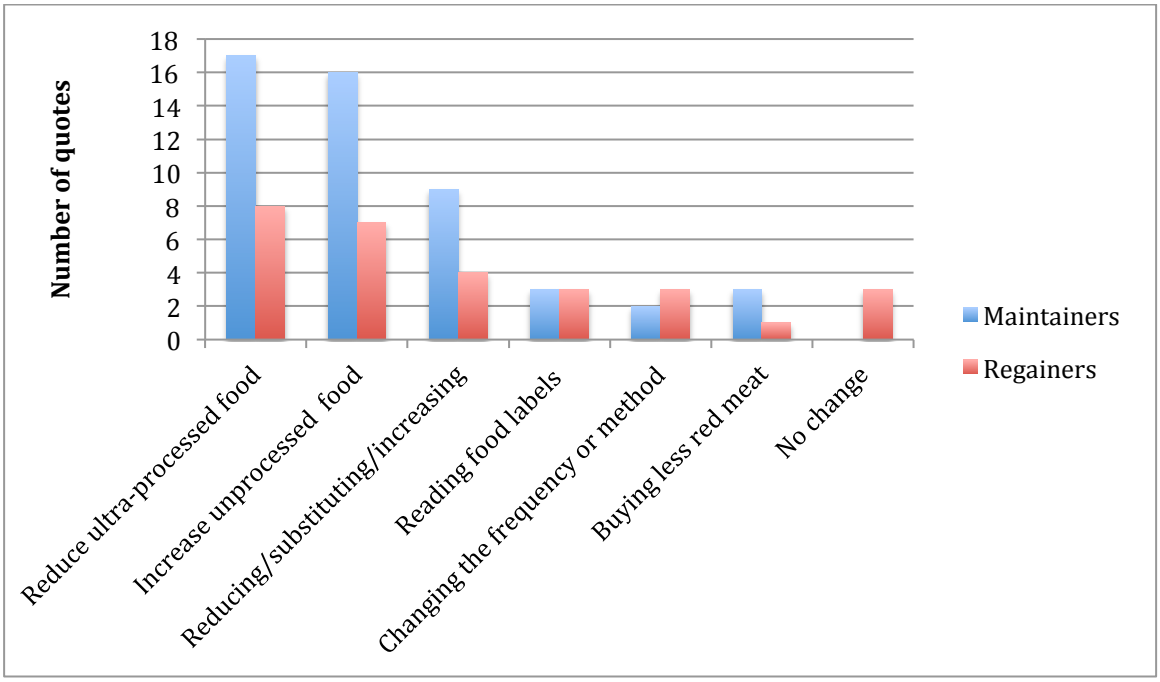
In summary, the majority of both maintainers and regainers consumed a plate similar to the CFG Eat Well Plate; however, regainers seem to consume bigger portions of grain products and meat & alternatives when compared to maintainers. Without exception, maintainers consumed at least one cup of vegetables per meal, whereas regainers sometimes had no vegetables on their plate.

The content analysis revealed a total of 12 themes describing changes made by participants in **food purchases** since the beginning of their weight loss journey. The full description of each theme can be found in Annex 4. The most emphasized themes were: **reducing the purchases of ultra-processed foods** and **increasing purchases of unprocessed or minimally processed foods**. As compared to regainers, maintainers were twice as likely to report these two changes. For example, quotes like "I reduced the purchase of chips," "I buy less sweetened-carbonated drinks," and "less cold-cuts" were classified as reducing purchases of ultra-processed foods. Quotes such as "I buy a lot more fresh produce, fruits, and vegetables" and "I buy more natural products" or "nuts" were classified as increasing the purchases of unprocessed or minimally processed foods (Table 5).

Maintainers were also two times more likely to report **reducing/substituting/ increasing the purchases of a reformulated product at the nutrient level** as compared to regainers. Citations such as "I try to choose foods with less or no sugar," "I buy light cheeses," "I eat cereals with protein," or "we buy products without added salt or less salt for broths" were

included in the theme of reducing/substituting/increasing the purchases of a reformulated product at the nutrient level. An equal number of maintainers and regainers mentioned that they were now **reading food labels**. A few maintainers and regainers said that they had changed either the **frequency or their way of grocery shopping**. A few maintainers mentioned buying **less red meat**, whereas this was stated by only one regainer. Three regainers said that they made **no changes**.

Table 5 Changes made in food purchases by both maintainers and regainers



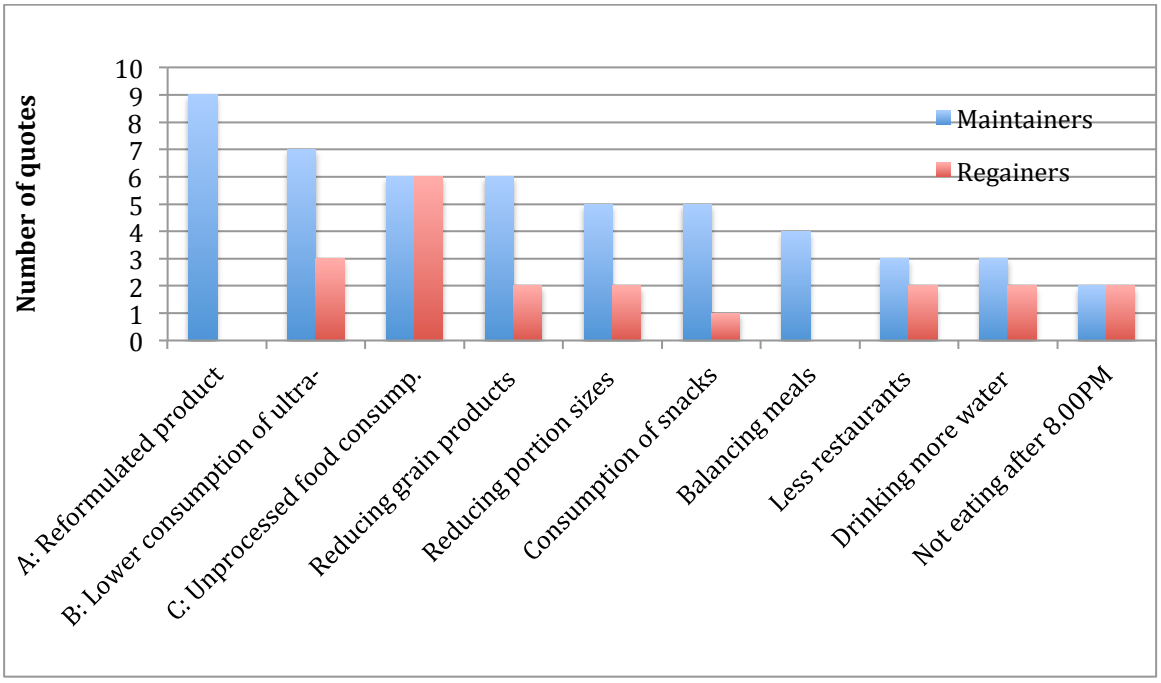
A total of 31 different themes emerged from the analysis of the change made in **food consumption** by maintainers and regainers since the beginning of their weight loss journey. A majority of maintainers reported having **reduced/substituted/increased the consumption of a reformulated product at the nutrient level**, whereas no regainers mentioned this change. Quotes such as "significant reduction in foods containing sugar," "less fatty-foods such as croissant with cheese," or "I increase my amount of protein at breakfast" were classified under reducing/substituting/increasing the consumption of a reformulated product at the nutrient level (Table 6).

Consuming less ultra-processed foods was also highly emphasized by maintainers and less

so by regainers. Interestingly, the same number of quotes for maintainers and regainers were identified in terms of **increasing the consumption of unprocessed or minimally processed foods**, with an emphasis on consuming more vegetables within the regainers.

Other popular dietary changes among maintainers were the **reduction of starchy foods**, "I no longer eat pasta or white bread," "I consume less rice, couscous and pasta," and the **reduction of portion sizes** and **the consumption of snacks** such as "I add snacks during the day," "made better food combination for my snacks," or "adding balanced snacks in between meals, especially at work", whereas only a few regainers reported these three strategies. **Balancing meals**, indicative of quotes such as "I pay attention when portioning plates. I try as often as possible to respect 1/2 vegetables, 1/4 protein 1/4 carbohydrates" was only mentioned by a few maintainers and no regainers.

Table 6 Changes made in food consumption by both maintainers and regainers



** Changes made by regainers during weight loss only, and not maintained during weight regain

A: Reducing/substituting/increasing the consumption of a reformulated product at the nutrient level

B : Lower consumption of ultra-processed food

C : Increasing unprocessed or minimally processed foods consumption

Table 7 shows the differences amongst maintainers and regainers regarding **activities and self-monitoring strategies**. Participants who had maintained their weight loss were approximately 13 times more likely to practice PA (93.3%) as compared to regainers (7.1%). Close to 50% of maintainers practiced PA for at least 300 minutes/week in comparison to 7% for regainers (p-<0.001). No significant difference was found between participants in the average time spent in front of a screen (TV, computer, or cell phone).

Maintainers were significantly more likely to record their food intake (100% versus 71.4%) and monitor their weight (93.3% versus 35.7%) as compared to regainers. All the maintainers recorded their food intake for at least one week whereas only 42.8% of regainers did. Maintainers were also more likely to have undergone more nutritional consultations with the dietitian when compared to regainers (average of 9.0 vs 5.4).

Table 7 Lifestyle and self-monitoring strategies

	Maintainers % (n/N)	**Regainers % (n/N)**	**p-value**
PA (minutes/ week)			
None	6.7 (1/15)	92.9 (13/14)	<0.001
[1-150]	26.7 (4/15)	0.0 (0/14)	
]150-300]	20.0 (3/15)	0.0 (0/14)	
]300-450]	46.7 (7/15)	7.1 (1/14)	
Practicing PA	93.3 (14/15)	7.1 (1/15)	<0.001
Food recording	100.0 (15/15)	71.4 (10/14)	0.042
Food recording duration			
Never	0.0 (0/15)	28.6 (4/14)	0.025
[1 day – 1 week]	0.0 (0/15)	21.4 (3/14)	
]1 week – 1 month]	40.0 (6/15)	35.7 (5/14)	
]1 month – 3 months]	26.7 (4/15)	7.1 (1/14)	
[3 months<]	26.7 (4/15)	0.0 (0/14)	
Intermittent	0.0 (0/15)	0.0 (0/14)	
Weight monitoring	93.3 (14/15)	35.7 (5/15)	0.002
Weight monitoring frequency			
Never	6.7 (1/15)	64.3 (9/14)	0.008
]Never – 1/month]	20.0 (3/15)	0.0 (0/14)	
]1/month – 1/week]	60.0 (9/15)	21.4 (3/14)	
]1/ week – multiple/week]	6.7 (1/15)	14.3 (2/14)	

]multiple/week-everyday]	6.7 (1/15)	0.0 (0/14)	
Screen time per week			
<0.5 hr/day	0.0 (0/15)	0.0 (0/14)	
]0.5 hr – 1 hr/day]	20.0 (3/15)	7.1 (1/14)	0.634
]1 hr – 2 hrs/day]	46.7 (7/15)	42.9 (6/14)	
]2 hrs – 3 hrs/day]	20.0 (3/15)	21.4 (3/14)	
[>3 hrs/day]	13.3 (2/15)	28.6 (4/14)	

Table 8 illustrates different **psychological factors** between the two groups. No significant differences were found between maintainers and regainers in terms of their history of depression, eating disorders or mood. Maintainers were less likely to eat their emotions than regainers.

Table 8 Psychological factors

	Maintainers % (n/N)	**Regainers % (n/N)**	**p-value**
Emotional eating			
Never/Rarely	80.0 (12/15)	7.1 (1/14)	<0.001
Often/Always	20.0 (3/15)	92.9 (13/14)	
History of depression	60.0 (9/15)	57.1 (8/14)	1.000
Eating disorder	6.7 (1/15)	0.0 (0/14)	1.000
Mood (on average)			
Excellent	26.7 (4/15)	50.0 (7/14)	0.264
Good	73.3 (11/15)	50.0 (7/14)	
Bad	0.0 (0/15)	0.0 (0/14)	

Table 9 shows that the vast majority (more than three quarters) of both maintainers and regainers felt receiving support and understanding from their **social environment**. However, maintainers were significantly more likely to claim that their family, friends, and/or colleagues are aware they are trying to lose weight or to adopt healthier eating habits and lifestyle as compared to regainers. Maintainers were also more likely to have attended more sessions with the dietitian than regainers. There were no significant differences in family, friends, and/or colleagues understanding and respecting the dietary or lifestyle choices of participants nor in the support of their entourage.

Table 9 Social and environmental strategies

	Maintainers % (n/N)	**Regainers % (n/N)**	**p-value**
Family, friends and/or colleagues aware that participant is trying to lose weight or adopt healthier	100.0(15/15)	71.4(10/14)	0.042

eating habits			
Family, friends and/or colleagues understanding & respecting dietary or lifestyle choices	100 (15/15)	90.0(9/10)*	0.40
Family support	93.3 (14/15)	77.8 (7/9)	0.533
Friends support	100.0(14/14)	77.8 (7/9)	0.142
Colleagues support	90.0(9/10)**	88.9 (8/9)	0.737
Number of nutrition consultations attended			
[1-3]	6.7 (1/15)	35.7 (5/14)	0.048
]3-6]	40.0 (6/15)	50.0 (7/14)	
]6-9+	53.3 (8/15)	14.3 (2/14)	

*Missing values where question did not apply to participants whose entourage wasn't aware of their weight loss journey.

**Missing where question did not apply to participants (e.g. colleagues not aware that participant is making changes or participants not working, hence they don't have colleagues).

Table 10 shows the **consumption environment** of maintainers and regainers. There was no significant differences for any of the consumption environment component; that is, if participants consumed any of the three meals alone or in company, the location of meal consumption (at the table, in front of a screen, on the road, on the counter corner or other places), kept sweet or salty food at home, kept any food at home where controlling consumption is hard, and had a rule where some foods are not allowed in the house. Maintainers were marginally more likely to eat their lunch alone and in front of a screen as compared to regainers but these differences were not significant (p=0.067; p=0.073).

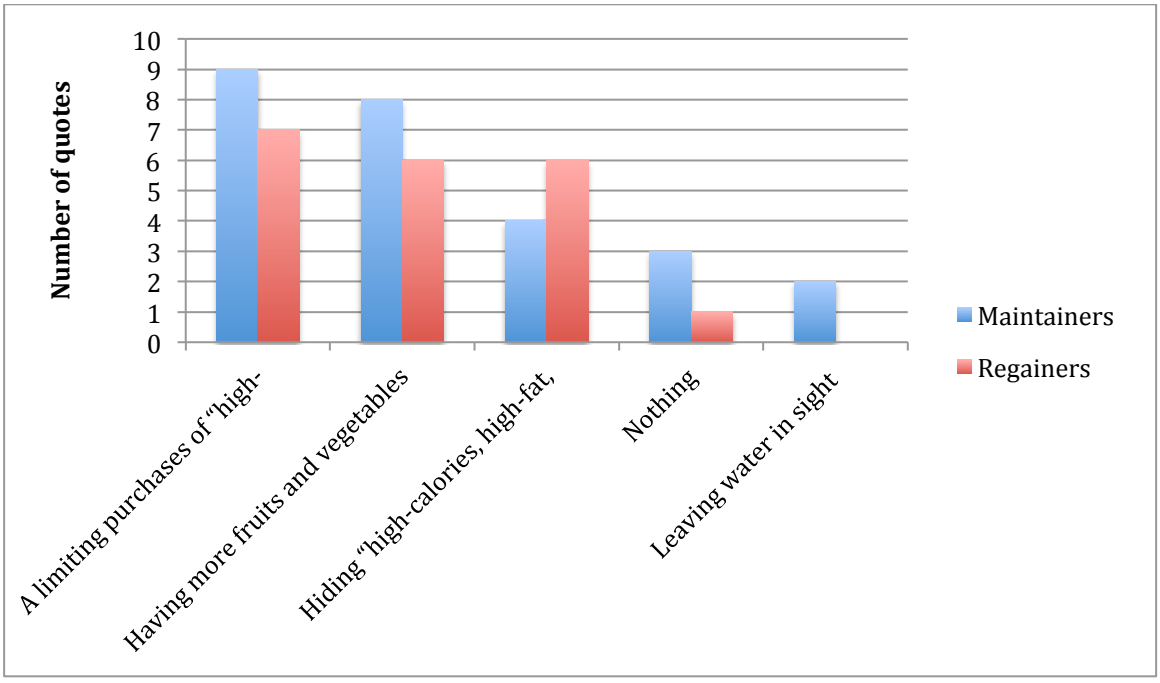
Table 10 Consumption environment

	Maintainers % (n/N)	**Regainers % (n/N)**	**p-value**
Eating breakfast			
Alone	80.0 (12/15)	78.6(11/14)	
In company	20.0 (3/15)	21.4 (3/14)	1.000
Eating lunch			
Alone	60.0 (9/15)	23.1 (3/14)	
In company	40.0 (6/15)	76.9 (10/14)	0.067
Eating supper			
Alone	40.0 (6/15)	35.7 (5/14)	
In company	60.0 (9/15)	64.3 (9/14)	1.000
Eating breakfast			
At the table	53.3 (8/15)	35.7 (5/14)	
In front of a screen	26.7 (4/15)	28.6 (4/14)	0.614
On the road	0.0 (0/15)	0.0 (0/14)	
On the counter corner	20.0 (3/15)	28.6 (4/14)	
Other: Walking	0.0 (0/15)	7.1 (1/14)	

Eating lunch			
At the table	46.7 (7/15)	76.9	
In front of a screen	46.7 (7/15)	(10/14)	0.073
On the road	0.0 (0/15)	7.7 (1/14)	
On the counter corner	6.7 (1/15)	0.0 (0/14)	
Other:	0.0 (0/15)	15.4 (2/14)	
		0.0 (0/14)	
Eating dinner			
At the table	73.3 (11/15)	64.3 (9/14)	0.434
In front of a screen	20.0 (3/15)	35.7 (5/14)	
On the road	6.7 (1/15)	0.0 (0/14)	
On the counter corner	0.0 (0/15)	0.0 (0/14)	
Other:	0.0 (0/15)	0.0 (0/14)	
Keep foods at home where controlling consumption is hard			
Never/Rarely	57.1 (8/14)	46.2 (6/13)	
Often/Always	42.9 (6/14)	53.8 (7/13)	
			0.706
Keep sweet & salty snacks at home			
Never/Rarely	53.3 (8/15)	50.0 (7/14)	1.000
Often/Always	46.7 (7/15)	50.0 (7/14)	
Specific foods not allowed in the house or to be purchased			
	13.3 (2/15)	28.6 (4/14)	
Yes	86.7 (13/15)	71.4	0.390
No		(10/14)	

Six environmental changes were identified from the content analysis of this topic. **Eliminating/limiting purchases of "high-calories, high-fat, high-sugar**, **eliminating savoury snacks**, and **having more fruits and vegetables at home that are ready** to eat were the most popular changes made to the home environment by both maintainers and regainers. However, they were scarcely more mentioned by maintainers. **Hiding "high-calories, high-fat, high-sugar"** savoury snacks was also a popular strategy stated by both groups. **Leaving water in sight** (on the counter) was a strategy mentioned by two maintainers. A few maintainers also said that they **didn't make any changes** (Table 11).

Table 11 Changes made in home food environment of maintainers and regainers



A : Eliminating/limiting purchases of "high-calories, high-fat, high-sugar" savoury snacks

Table 12 shows the **confidence, motivation, and importance to reach the objective** of weight loss and/or change dietary habits among maintainers and regainers. There were no significant differences found between maintainers and regainers.

Table 12 Confidence, motivation, and importance of reaching and maintaining objective (on a scale from 1 to 5, 1 being the lowest, 5 being the highest)

	Maintainers n = 15 % (n/N)	**Regainers n=14 % (n/N)**	**p-value**
Level of importance to change dietary habits			
1 Not important	0.0 (0/15)	0.0 (0/14)	0.371
2 Somehow important	6.7 (1/15)	7.1 (1/14)	
3 Important	6.7 (1/15)	21.4 (3/14)	
4 Very important	20.0 (3/15)	35.7 (5/14)	
5 Extremely important	66.7 (10/15)	35.7 (5/14)	
Level of motivation to lose weight			
1 Not motivated	0.0 (0/15)	0.0 (0/14)	0.400
2 Somehow motivated	0.0 (0/15)	7.1 (1/14)	
3 Motivated	6.7 (1/15)	0.0 (0/14)	
4 Very motivated	42.9 (6/15)	57.1 (8/14)	

5 Extremely motivated	53.3 (8/15)	35.7 (5/14)	
Level of importance to reach weight loss goal			
1 Not important	0.0 (0/15)	0.0 (0/14)	0.166
2 Somehow important	0.0 (0/15)	7.1 (1/14)	
3 Important	0.0 (0/15)	21.4 (3/14)	
4 Very important	33.3 (5/15)	28.6 (4/14)	
5 Extremely important	66.7 (10/15)	42.9 (6/14)	
Level of confidence to reach weight loss goal			
1 Not confident	0.0 (0/15)	0.0 (0/13)	0.131
2 Somehow confident	26.7(4/15)	7.7 (1/13)	
3 Important	6.7 (1/15)	38.5 (5/13)	
4 Very confident	33.3 (5/15)	38.5 (5/13)	
5 Extremely confident	33.3 (5/15)	28.6 (2/13)	

Table 13 presents different **culinary practices** among maintainers and regainers. Most people claimed cooking regularly (100% of maintainers and 86% of regainers). No significant differences were found between maintainers and regainers in their culinary practices, which included: cooking (yes or no), cooking frequency, how cooking skills were acquired, average cooking time to prepare a meal, and perceived cooking skills by participants.

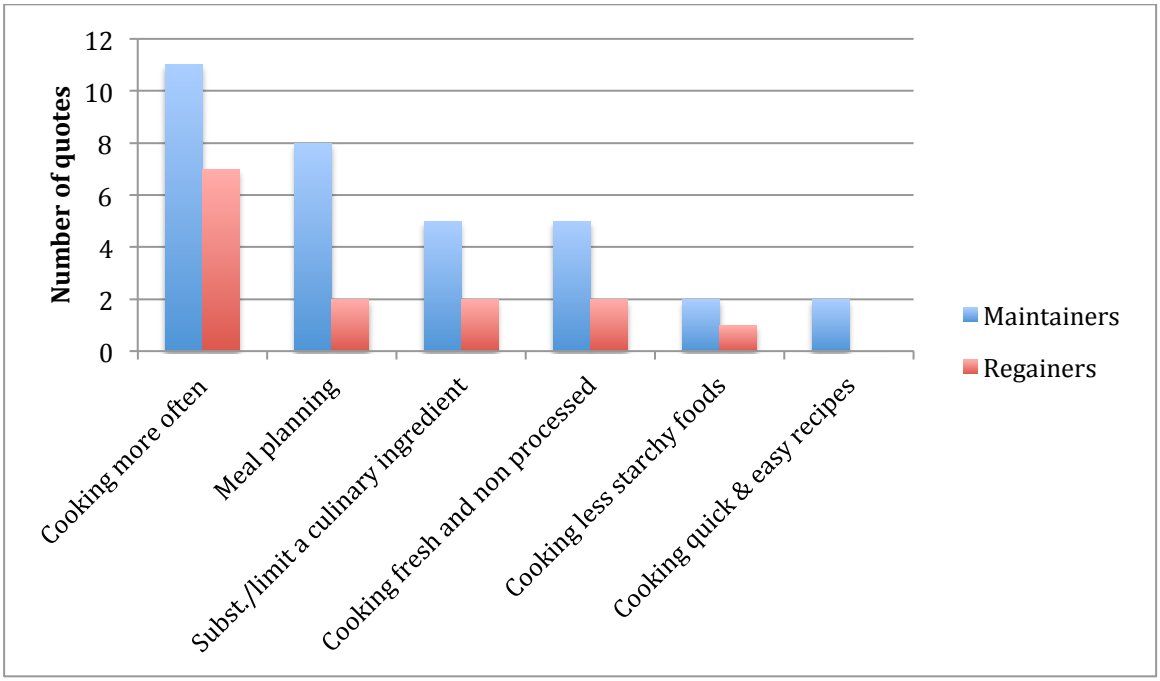
Table 13 Culinary practices

	Maintainers % (n/N)	**Regainers % (n/N)**	**p-value**
Cooking			
Yes	100.0 (15/15)	85.7 (12/14)	0.224
No	0.0 (0/15)	14.3 (2/14)	
Cooking frequency			
At every meal	33.3 (5/15)	16.7 (2/14)	0.554
Everyday	33.3 (5/15)	41.7 (5/14)	
Two to five times/week	33.3 (5/15)	33.3 (4/14)	
Once/week or less	0.0 (0/15)	8.3 (1/14)	
How were the cooking skills acquired			
Parents or friends	73.3 (11/15)	50.0 (7/14)	0.277
Cooking classes	0.0 (0/15)	7.1 (1/14)	
Recipes	20.0 (3/15)	42.9 (6/14)	
Other:	0.0 (0/15)	0.0 (0/14)	

	Maintainers	Regainers	p-value
Average cooking time to prepare meal (minutes)	N=15 30.7	N=13 38.5	0.135
Perceived cooking skills by participant	N=15 3.5	N=14 3.5	1.000

A total of 11 themes emerged from the qualitative analysis of the changes made in culinary habits of maintainers and regainers. **Increasing the frequency or time allocated to food preparation and cooking** such as "I take more time to choose recipes and cook" or "I have prepared more vegetables for meals and snacks" was the most popular strategy mentioned by both maintainers and regainers but more often by maintainers. **Meal planning or preparing meals in advance** was highly emphasized by maintainers but less by regainers. **Substituting/reducing a culinary ingredient** (e.g. replacing margarine with olive oil, using less salt, butter, and oil, replacing sugar with applesauce in recipes, etc.) and **cooking with fresh and minimally processed foods or "healthier" foods** (e.g. replacing spaghetti pasta with spaghetti squash or making healthier choices) were all changes stated by maintainers and not as much by regainers. Maintainers also mentioned **cooking less starchy food and quick and easy recipes**.

Table 14 Changes made in culinary habits of maintainers and regainers



*Perceived barriers by regainers

Table 15 presents the weight maintenance behaviours among maintainers. All maintainers mentioned to continuously making effort to eat healthy during maintenance and the majority had a relapse during maintenance (i.e. small weight regain, going back to old habits, etc.).

Table 15 Weight maintenance behaviours

	Maintainers % (n/N)
Continue to make effort to eat healthy	**100 (15/15)**
Had a relapse during maintenance	**80 (12/15)**

In summary, when looking at all the significant differences between maintainers and regainers, the results are very similar to the ones found for the most reported strategies among maintainers. **Dietary strategies** used significantly more within maintainers than regainers included: reading food labels, choosing whole grain products, focusing on food quality and the quantity consumed, planning meals in advance, not emotionally eating consuming more fruits and vegetables on a daily basis (≥2 portions/day) and limiting sweet beverage consumption.

These strategies were all confirmed by the content analysis of the dietary strategies reported by maintainers and regainers and again, this sums up to cooking more often, reducing ultra-processed foods and increasing unprocessed or minimally processed food consumption and purchases. The lifestyle and monitoring strategies used more significantly by maintainers were practicing PA (≥ 40 minutes/ day), weight monitoring and recording food intake, practicing PA was strongly confirmed by the qualitative analysis. The social strategies are to make sure to be surrounded by a social network who understand and respect the individuals dietary and lifestyle choice. Finally, to create a healthy physical food environment by eliminating/limiting purchases of "high-calories, high-fat, high-sugar" savoury snacks or hiding this type of snack and having more "ready-to-eat" fruits and vegetables at home were the most popular changes made to the home environment by both maintainers and regainers; however, it was slightly more frequently mentioned by maintainers. Consuming less meals at restaurants was a strategy used by both groups but slightly more for regainers.

5.3 Perceived barriers to weight loss maintenance experienced by maintainers and regainers and strategies to cope with the barriers

Table 16 presents the different **barriers associated with weight loss maintenance** among maintainers and regainers. Maintainers were generally less likely to report barriers associated to weight loss maintenance as compared to regainers. Eating out was a barrier for 71.4% of regainers as compared to only 20.0% of maintainers (p=0.009). PA was also a major barrier among regainers (100.0%) as compared to 66.7% for maintainers (p=0.042). However, food temptation was a barrier for all maintainers (100.0%) and not as much for regainers (64.3%) (p=0.017). There were no significant differences found for barriers in terms of the price of food items, availability/accessibility of food, nutritional information, reading, lack of time, stress, emotional eating, influence of others, and cooking between maintainers and regainers.

Table 16 Barriers to maintaining weight loss

	Maintainers % (n/N)	**Regainers % (n/N)**	**p-value**
Price of food items	6.7 (1/15)	7.1 (1/14)	1.000
Availability/accessibility to food	6.7 (1/15)	0.0 (0/14)	1.000

Eating out	20.0 (3/15)	71.4 (10/14)	0.009
Cooking	20.0 (3/15)	66.7 (6/14)	0.245
Influence of others	26.7 (4/15)	35.7 (5/15)	0.700
Nutritional information/food labels	26.7 (4/15)	7.1 (1/14)	0.330
Lack of time	66.7 (10/15)	50.0 (7/14)	0.462
Physical Activity	66.7 (10/15)	100 (14/14)	0.042
Stress	73.3 (11/15)	78.6 (11/15)	1.000
Emotional eating	86.7 (13/15)	92.9 (13/15)	1.000
Temptation	100 (15/15)	64.3 (9/14)	0.017

Eleven barriers were identified from the analysis of the perceived barriers by maintainers to weight loss and weight loss maintenance. The most prevalent barrier was **emotional eating**. To cope, the women reported drinking water, walking, brushing their teeth, ceasing to watch TV, hiding savoury snacks, reading a book, self-talking, or trying to sleep better. Another barrier was **food temptations**. This barrier was dealt with by walking, working or sleeping better, brushing teeth, not watching TV food ads, or reading a book.

Social life was also a trigger for eating such as going out to eat with friends or family in which case the only coping strategy mentioned was to go out less. Very few participants mentioned PA and practicing enjoyable activities and being cheered by a friend were some of the coping strategies employed for this barrier. Lack of time, boredom, not skipping any meals, being hungry, and being consistent were other barriers mentioned but by one maintainer per barrier. Work, stress, and diligence were also mentioned but maintainers mentioned no coping strategies .

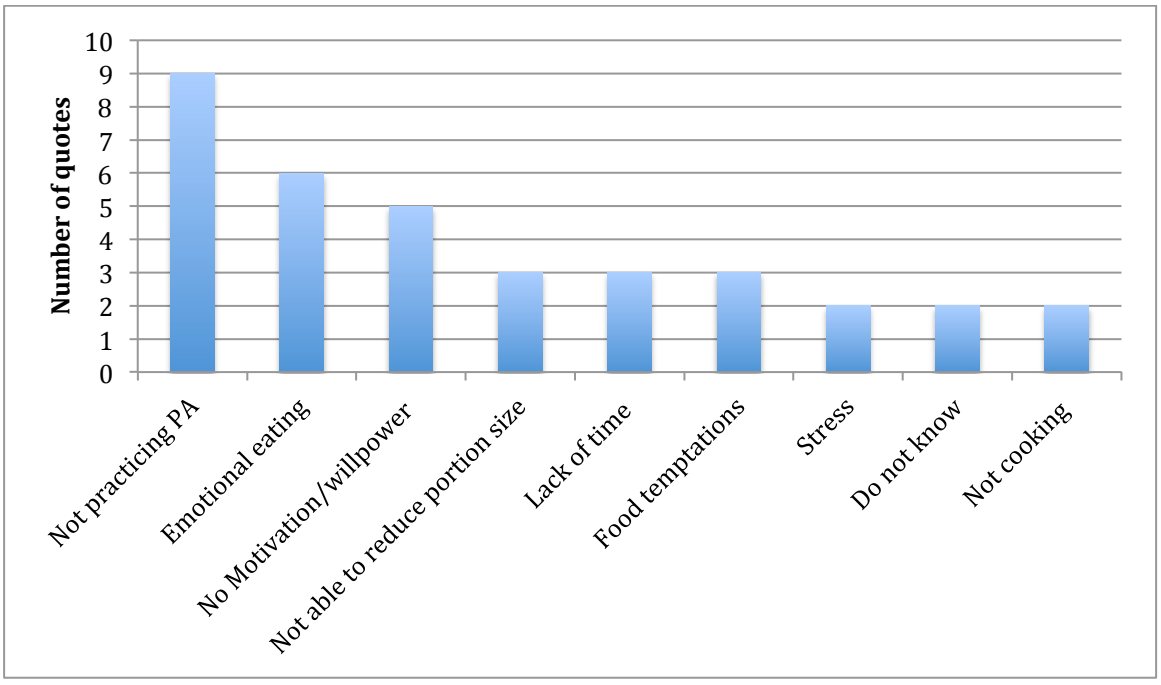
Table 17 Perceived barriers and coping strategies to weight loss maintenance by maintainers

Barrier	Example of coping strategies	Number of quotes (maintainers, n=15)
Emotional eating/cravings	-hiding savoury snacks -drinking water -taking a walk	7
Social life	-limit outings	3
Food temptations	-not watching TV with food ads -read a book -going for a walk	3

Physical activity	-encouragement from entourage -doing a pleasant physical activity	2

When regainers were asked what was the main reason why they did not maintain the weight loss, a total of 19 reasons emerged. Regainers' most emphasized barrier was to not being able to practice **PA** (64%, n=9). **Emotional eating** was also a barrier highly mentioned by participants. **Having no will power or motivation** was also popular. This was followed by **reducing portions, lack of time, food temptations, coping with stress** and not **cooking**. One participant per theme mentioned the following barriers as well: menopause, restaurants, spouse cooking "unhealthy food", work, diligence, medication, calculating calories, meal planning, food deprivation, and consumption of processed foods.

Table 18 Barriers to weight loss maintenance by regainers



To summarise, the majority of all reported barriers were either social or environmental. At the individual level, practicing physical activity was far more reported by regainers than maintainers. One psychosocial barrier highly reported by both regainers and maintainers was

emotional eating, but many strategies to cope with it were mentioned by maintainers. In terms of food environment, eating out was perceived as a significant barrier for regainers as opposed to maintainers and temptations was a barrier more prominent within the maintainers.

6. Discussion

The three specific objectives of the study were to 1) identify strategies associated to weight loss maintenance experienced by maintainers, 2) identify the significant differences associated with weight loss maintenance between maintainers and regainers and; 3) identify perceived barriers to weight loss maintenance experienced by maintainers and regainers and strategies to cope with the barriers. Each objective is discussed using the social-ecological multi-level model to link individual and environmental strategies with successful weight loss maintenance.

Characteristics

The exploratory study undertaken in this research suggests that maintainers tend to have completed a higher education level than regainers (college or more). These results are consistent with findings in the literature review. People with a higher education level may be better informed and tend to have better job position and have access to more resources, which may favour healthier eating as compared to those with a lower education. Elfhag & Rossner (2010) also reported that lower educational level was the most important drop-out rate characteristic in weight loss interventions, which suggests that those with a lower education level trying to adopt healthier lifestyle and/or dietary changes to lose weight may abandon these new habits quicker than those with a higher education level. Interventions aimed at healthy eating should consider vulnerable populations which may be more prone to unhealthy eating habits or who may have more difficulty in following healthy eating habits recommendations because of lack of resources, time, and lower literacy. For example, as re-gainers in this study were significantly less likely than maintainers to read food labels, it may have been because of a lack of understanding on how to properly analyze food labels, therefore it may be worth developing a way to understand labels more easily.

This study's findings that early and greater initial weight loss is associated with maintainers concur with other studies (Astrup et al., 2000; Anderson et al., 2001; Brikou et al., 2016; Fabricatore et al., 2009; Finer et al., 2006; Graham et al., 2014; Jeffery et al., 1998; Nackers et al., 2010; Ortner et al., 2015; Wadden et al., 1992, 2011). Maintainers also had lost significantly more weight by the end of intervention (after 3 months) compared to re-gainers, which support the fact that larger initial weight loss and the related positive quality of life changes (increased motivation, feeling better, etc.) may serve as reinforcements to maintain healthy behaviours and healthy habits (Nackers et al., 2010).

6.1 Strategies associated to weight loss maintenance experienced by maintainers

Individual-level strategies

Dietary behavioural strategies

Consistent meal timing was a strategy used by all maintainers. Irregular eating patterns appear less favourable to lose weight and achieve a healthy cardio metabolic profile. It was found that meal timing and frequency of eating occasions could lead to healthier lifestyle (St-Onge, MP, et al. 2017). **Eating breakfast daily** may decrease the risk of adverse effects related to glucose and insulin metabolism, which in turn may help to lose and maintain weight (St-Onge, MP, et al. 2017). **Reducing portions** was another popular strategy used by 100% of maintainers. This finding coordinate with the study of Santos (2017), where this strategy was used by 68.9% of the maintainers in the PWCR and it was also one of the main diet-related approaches used in the Karfopoulou et al. (2013) study.

Reading food labels was the dietary behavioural strategy most reported by maintainers and the most reported helpful nutritional knowledge acquired from the nutrition intervention intended to facilitate the adoption of healthier eating habits. This strategy was also confirmed by the literature review (Santos et al., 2017). Reading food labels may help consumers make healthier food purchases and informed choices (Mhurchu et al., 2018).

Many maintainers reduced/ substituted or increases their purchases of a reformulated product at the nutrient level, buying products that contained more fibres, more protein, less sugar or less fat were mentioned many times. This could mean that maintainers do try to make "lighter" choices or "more filling" choices, which in turn translates into consuming less calories. It has been recently found that many "low-fat" products could potentially contain more sugar or additives; however, participants in this study were well informed about reading the ingredient list on the food labels to avoid products that would have added sugar or other food additives (Nguyen, P. K et al. 2016).

The majority of maintainers reported that they were opting for **whole grain foods** the majority of the time. Whole grains generally have a higher fibre content, fiber intake promotes satiety and hence could help reduce the amount of food intake (Sarker & Rahman, 2017). Most maintainers also mentioned that they consumed **more vegetables and fruits**, and they also prepared them in advance to make them more readily available to consume. Again, fruits and vegetables do contain a high fiber intake, and they are also low-calorie density, which in turn could help to feel full and reduce the amount of calories consumed (Government of Canada, 2008).

One of the most quoted strategies by maintainers was to **reduce the consumption and purchases of ultra-processed foods**. NOVA defines ultra-processed foods as foods that are "not modified foods but formulations of industrial ingredients and other substances derived from foods, plus additives" (Moubarac, 2017, p. 11). Ultra-processed foods are related to low diet quality and are associated with greater risk of obesity and other diet-related non-communicable diseases (Moubarac, JC., 2017). Furthermore, **increasing purchases of unprocessed or minimally processed foods** was also one of the most quoted strategies by maintainers. The NOVA food classification defines unprocessed or minimally processed food as "fresh" or "whole" food derived from plants or animals without any industrial processing and food that is not "altered in ways that add or introduce any new substance (such as fats, sugars, or salt)" (Moubarac, 2017, p. 9). These foods are known to be the most nutritious foods and there is evidence that plant-based minimally processed food are protective against weight gain and chronic diseases (Katz, D.L. & Meller, S., 2014). Successful maintainers reported buying and consuming more fruits and vegetables, plain yogurt, eggs, fish and

poultry since the start of their weight loss journey until the time the study was conducted. **Cooking** was another popular strategy used by maintainers. The nutritional quality of food prepared at home has been found to be better than food prepared away from home, which usually contains more total calories, fat, and sodium and less fiber (Kruger et al., 2006). Cooking on a daily basis is also associated to higher consumption of fresh or minimally processed food which are known to be healthier and protective for health and against obesity (Monteiro et al., 2018). One of the main recommendations for improving the quality of the Canadian diet is to "maintain, develop, learn and share skills in food acquisition, preparation, cooking and presentation" (Moubarac, 2017).

Finally, most of the above strategies can be summed up to consuming higher **quality food** and less ultra-processed food,

Lifestyle and self-monitoring strategies

Practicing PA is one of the most emphasized lifestyle strategies reported by maintainers in this study, the majority also reported that it was the main strategy that helped them lose and maintain their weight. This strategy is well aligned with the literature review, as previously discussed, PA is the number one strategy used among NWCR members with at least 90% of members practicing PA and it is the most consistently reported strategy used among maintainers in most research findings (Wing & Hill, 2005; Kruger et al. 2006; 2008; Vanderwood et al. 2011; Ramage, 2013; Ogden 2014; Santos et al., 2017).

Self-monitoring of weight emerged as another very popular strategy among maintainers of this study. The NWCR found that most maintainers weighed themselves more than once a week; however, participants in this study were instructed not to weight themselves more than once a week (Butryn et al., 2007). Self-weighing may help an individual stay on track with healthy behaviours and/or can act as a positive reinforcement for healthy behavioural changes.

All maintainers reported **recording their food intake** for at least more than a week since their initial weight loss journey. Participants in this study were encouraged to keep a food diary for at least seven days during their weight loss intervention. The literature review conducted here

found no studies that looked at food recording and long-term weight-loss. However, a food diary may help individuals to be more conscious or aware of what and how much they eat. Food diaries can also help people and/or the dietitian identify areas where they can improve.

Social environmental strategies

Numerous maintainers mentioned that the nutrition follow-up with the dietitian was a great source of support and one of the main elements that helped them achieve and maintain their weight loss. As discussed in the literature review, although not many studies have looked at the relationship between social support and weight loss maintenance, the few studies available do seem to suggest that social support is an important factor contributing to weight loss maintenance, while lack of support or negative support can be associated with weight regain (Kruger et al. 2006). Relatedly, many maintainers in this study reported that the support and encouragement of their social network (friends, family, or colleagues) helped maintainers lose and maintain their weight loss.

Physical environmental strategies

Eliminating/limiting purchases of "high-calories, high-fat, high-sugar" savoury snacks was another dietary strategies used to reach and maintain weight loss. According to the 2004 Styles survey, participants who mentioned being very confident in their ability to keep fewer high-fat, high-calorie snacks at home adjusted odds of successfully maintaining weight loss at 57% higher than those who stated being not confident (Kruger et al., 2008). This strategy was used to achieve weight loss and maintain it by 97.6% of women maintainers in the PWCR (Santos et al. 2017). Maintainers of this study often reported having more fruits and vegetables ready to eat at home, which may increase the consumption of it. In a US study, participants with candies on their desk consumed 29%? more each day than those who had the container in their desk, and 56% more than those who had to walk two meters to reach them, therefore if visibility and convenience increase the consumption of chocolate, the same effect may also work for healthier foods such as fruits or vegetables (REF, Painter J., 2002 s).

Finally, for maintainers, reducing portion size, consuming better quality food, limiting ultra-processed foods, being active, monitoring weight, recording food intake, having great

support from both a health professional and friends or family, and creating a healthier, easy access to healthy foods at home seem to be the most reported strategies by maintainers.

6.2 Significant differences associated with weight loss maintenance between maintainers and regainers.

Following our exploratory content analysis in which we identified all potential important strategies to support long-term weight loss, we also verify amongst those and other less reported strategies what are the strategies significantly different between maintainers and regainers. These resuls are discussed in this section.

Individual-level strategies

Dietary behavioural strategies

Maintainers are more likely to **read food labels than** regainers. As previously discussed, understanding and comparing food labels is not always easy (Health Canada, 2016). Although all participants in this study were thought how to read food labels (mainly how to read ingredient list and % daily values), it is possible that some regainers may not have assimilated this new skill, which may have made it harder to make healthier eating choices. The improvements to food labelling currently under way by Health Canada may help all consumers make more informed choices as the list of ingredient will be easier to read, the serving size will be more consistent and many more changes based on feedback from Canadians and stakeholders will be made (Government of Canada, 2017).

It was also found that maintainers are more likely to **reduce the consumption and purchases of ultra-processed foods**. Successful maintainers are more likely than regainers to reduce the purchase and consumption of foods such as chips, sweets, sugary drinks, and pre-prepared ready meals. These findings were also confirmed by our qualitative analysis. Furthermore, our qualitative findings suggest that maintainers are more likely to report an **increase in their purchase of unprocessed or minimally processed foods**. Specifically, this study found that maintainers were five times more likely to consume seven to 12 portions of fruits and vegetables a week as compared to regainers.

Regainers are significantly more likely to consume **non-carbonated sweet beverages** (e.g. juices) than maintainers but no significant differences were found between maintainers and regainers in terms of sweet carbonated beverages. This could be because sweet carbonated beverages are easy to perceive as "non-healthy" drinks, whereas juice is often perceived as being as healthy as whole fruit. CFG (2007) positions fruit juice as a nutritionally equivalent alternative to whole fruit. In the literature, excessive fruit juice consumption was found to be associated with increased risk for obesity as juice contains a high level of sugar, low levels of fiber, and lower effects on satiety (Wojcicki & Heyman, 2012).

Subsequently, the findings of this study suggest that maintainers are more likely to employ the strategy of **increasing consumption of fiber-rich foods.** This strategy was mentioned by a majority of maintainers who reported opting more often for whole grain products instead of refined grain products, which in turn may translate into a reduction in ultra-processed foods. The qualitative interview analysis of this study also confirmed this, where participants reported substituting refined grains for whole grains or increasing their intake of fruits and vegetables (also fiber rich foods). Several studies have shown an inverse relationship between the consumption of dietary fiber and weight loss, which in turn can help to maintain the weight loss (Sarker & Rahman, 2017). Higher intakes of dietary fiber foods have also been associated with decreased risk of colorectal cancer (World Cancer Research Fund, 2011).

Next, this study found that maintainers are more likely to **increase** their **cooking frequency** at the start of a weight loss journey. They also mentioned cooking with more unprocessed or minimally processed foods and less processed foods (chia seeds, replacing spaghetti pasta and meat sauce with spaghetti squash and lentil sauce, replacing margarine with olive oil, etc.). Hence, reading food labels, increasing the consumption of unprocessed or minimally processed foods, limiting the consumption of ultra-processed foods, increasing fiber rich food, and home cooking are all dietary behavioral strategies that appear to contribute toward weight loss maintenance. The latter can be interpreted into one single dietary recommendation which is: **choose better quality food (whole foods)**.

Another popular dietary strategy among maintainers versus regainers was **reducing portion sizes** or quantity of food consumed. The latter was also confirmed through the

qualitative analysis. Regainers reported consuming bigger portions of both grain products and meat and alternatives at mealtime as compared to maintainers. Using a smaller plate, leaving a few bites behind, and sharing and cutting food into smaller portions are all suggested srategies to reduce portion sizes. Reducing grain products (bread, pasta, rice, couscous, etc.) consumption was also mentioned by maintainers. These findings are consistent with the literature review (Karfopoulou et al., 2013; Kruger et al., 2006; 2008; Santos et al., 2017). Reduced portion size could be related to consuming a **low-calorie, low-fat diet** as it was popular dietary strategy used by many maintainers in the literature review. The qualitative analysis of this study found that more maintainers than regainers bought and consumed low-fat foods such as cheese, milk, yogurt, and meat or that they substituting oil in recipes for applesauce. The emphasis on reducing consumption of dietary fats and saturated fats began in the 1970s and it has led in the overuse of refined carbohydrates—notably sugars, by food manufacturers and thus, an overconsumption in Canada, the US, and many other countries (Liu et al., 2017). Most low-fat foods, advertised as "healthy options", contain more sugar than their "full fat" versions; for example, regular mayonnaise contains 0.3g of sugar per tbsp, whereas its non-fat counterpart contains 10.3g per tbsp (Nguyen et al., 2016). As a result, the quality of our diet has not improved nor the obesity epidemic now well reported as related to chronic diseases (Moubarac, 2017). Furthermore, a one year randomized clinical trial involving more than 600 participants comparing low-fat to low-carb diets found that there was no significant difference in weight loss between the low-fat and low-carb diet group and the non-diet group, indicating that low-fat and low-carb diets are not superior. However in this study, participants knew how to read food labels, therefore they may have opted for plain low-fat dairy product or other lower-fat product that did not contain more sugar or other additives which may explain why it contributed to their weight loss maintenance.

Meal planning was one of the most emphasized culinary habit change but our quantitative analysis showed that it was only marginally more significantly reported among maintainers versus regainers. To cope with lack of time, maintainers planned their meals in advance. Meal planning is associated with better diet quality and lower odd of obesity (Ducrot et al., 2017). Health Canada also recommends to plan and prepare healthy meals and snacks in their new Food Guide (Government of Canada, 2017).

Aiming for a **balanced plate** similar to the CFG Eat Well Plate (2007), where half of the plate is filled with vegetables, a quarter with grain products, and a quarter with meat and alternatives, is a dietary change more likely to be reported by maintainers. Vegetables are loaded with fiber and water and are low in calories; therefore, consuming half a plate of vegetables can increase satiety level and help with losing and maintaining weight (CDC, 2012). Respondents did not specify whether the sources of grain were mostly whole grains; however, since maintainers had mentioned opting out for whole grains most of the time, the fibers from whole grains would also contribute to higher satiety levels. Meat and alternatives provide proteins and these are also known to aid in satiety (Westerterp-Plantega et al., 2012). The CFG Eat Well Plate (2007) was created to promote healthy eating, which in turn may help to reach and maintain a healthy weight. However, the types of plates described in the questionnaire did not include data on whether any of the food included was processed and thus, data on the quality of the food chosen and combination type of plate was not available.

No significant differences were found between maintainers or regainers in terms of **snacks consumption in between meals**, however, this study found that maintainers are more likely, when compared to regainers, to incorporate healthy snacks (fruits, plain yogurt, low-fat cheese, whole grain crakers, etc.) in-between meals to maintain weight loss. This would suggest that consumption of healthy snacks possibly affects satiety and promotes appetite control, which could contribute to weight loss maintenance (Njike et al., 2016). Equally, it could also mean that planning healthy snacks prevents one from impulsive snacking or snacking on what is available at work/school which is often ultra-processed (Baraldi et al. 2018). No significant differences were found between maintainers and regainers in terms of **diet consistency**. Less than half of maintainers mentioned that their diet was stricter on weekdays and more flexible on weekends. The literature review found that dietary restriction is essential for initial weight loss but for long-term weight loss maintenance, diets can become less restricted and more flexible (Epiphaniou and Ogden, 2010). *Lifestyle and self-monitoring strategies*

Maintainers were 13 times more likely to engage in some sort of PA compared to regainers ($p<0.001$). The type of PA was not within the scope of this study; however, it was found that close to 50% of maintainers spend more than 300 minutes per week on PA, which equals to >40 minutes day. This mirrors the findings from the literature review. To increase

PA, United States Department of Agriculture (USDA) suggests choosing activities that you enjoy and can do regularly. This can be as simple as replacing a coffee break with a walk, taking public transport instead of a car, or cleaning the house. The American College of Sports Medicine (ACSM) suggests for maintaining weight loss, engaging in PA for >250 min/week (Donnely et al., 2009). The Center for Disease Control and Prevention (CDCP) recommends doing 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity aerobic activity per week to maintain your weight. Moderate-intensity activity includes walking briskly (15mins/mile), doing light yard work, or biking at a casual pace, whereas vigorous activity includes jogging/running or swimming laps. However, both the ACSM and CDCP agree that the amount of PA needed to maintain weight can vary from one individual to another.

Maintainers are more likely to **monitor their weight** than regainers. In this study, the majority of maintainers weighed themselves on a weekly basis. Self-weighing may allow people to catch dietary slips before they worsen and turn into larger weight gain, or it may be that regainers prefer to avoid the scale to avoid disappointment. Similar findings were found in the literature review. Maintainers are also more likely to **record their food intake** for at least one week when compared to regainers. As previously discussed, recording food intake may help individuals to be more conscious of their food choices, or participants may be "worried" to be judged by their dietitian if they eat "less nutritious" food, therefore writing what they eat motivates them to choose healthier food options. Regainers may prefer to avoid writing their food intake if they consume "unhealthy" options such as crisps, sweets and *fastfood*.

Psychosocial strategies

The main psychosocial finding of this study is that regainers are much more likely to report **emotional eating** as compared to maintainers; regainers were more than four times likely to eat their emotions as compared to maintainers. This topic is further discussed in the next section on perceived barriers of weight loss maintenance. No significant differences were found between maintainers and regainers in terms of history of depression, eating disorders or mood; however, mental health is a very sensitive topic, and thus, participants may not have been comfortable to discuss with the researcher about this topic, or it may have been that the questions were "too general". Many studies from the literature review found weight loss

maintenance was associated with fewer symptoms of depression; however, most of these studies used a questionnaire such as the Beck Depression Inventory (BDI) or the CES-D to calculate the depression score, which is a much more valid method for results. Depressive mood is related to increased craving in sweets therefore, it may be harder for those experiencing a depressive emotional mood to make healthy dietary choices (Willner et al, 1998).

Regarding the **confidence, motivation and importance** of reaching and maintaining weight loss objective, no significant differences were found between maintainers and regainers. Bertz & Sparud-Lundin (2015) suggest, "The experience of a successful outcome following a behavioural change may increase motivation". In this study, it may have been possible that all participants were highly motivated to lose and maintain their weight loss goal, but if no results were observed early enough, then their motivation to keep going may have reduced with time. This suggests that it may be important to reinforce individual motivations and confidence when the results are slower with the help of different behavioural strategies other than just seeing weight loss results.

Social environmental strategies

Maintainers were more likely to have attended more nutrition consultations with the dietitian as compared to regainers, and they were significantly more likely to claim that their family, friends, and/or colleagues were aware they are trying to lose weight or to adopt healthier eating habits and lifestyle as compared to regainers. This demonstrates that having a supportive network and seeking support from a health professional may help to achieve and maintain a weight loss. These findings were also supported by the literature review. Perri et al. (1988) found individuals who followed maintenance group sessions delivered every two weeks during one year following the weight loss phase maintained 13.0kg of their 13.2kg total lost, whereas those who did not attend such sessions kept off only 5.7kg out of a 10.8kg average weight lost. It is fair to conclude that maintenance sessions help individuals with support and motivation to keep the weight off. .

Physical environmental influence and factors

When maintainers and regainers of this study were asked what they had changed in the **food environment of their home**, both groups reported having more fruits and vegetables ready to eat or easily accessible or in sight (on the counter) and limiting, or hiding savoury snacks (high-calories, high-fat) such as crisps and sweets, however slightly more maintainers reported this change. Similar findings were found in the literature review. Gorin et al. (2011) studied the home environment of overweight and healthy weight adults and the relationships between the environment and weight-control behaviours, They found that the homes of overweight people were associated with more high-fat snacks and spreads and fewer low-fat snacks and fruits and vegetables than the homes of normal-weight adults. They also found that having more high-fat snacks in the home was associated with an increase in percentage of calories from fat. This suggests that the home environment can be obesogenic; given that approximately two-thirds of our calories are consumed at home (Biing-Hwan, 1999), modifying our home environment to promote healthy choices is a logical strategy to use for weight loss and weight loss maintenance.

In summary, the main significant differences in dietary strategies between maintainers and regainers are that maintainers are more likely to: read food labels; reduce the consumption and purchases of ultra-processed foods; increase purchases of unprocessed and minimally processed foods; focus on better food quality; consume less non-carbonated sweet beverages; increase fiber-rich foods (whole grains, vegetables and fruits); cook more often; reduce food quantity (or portion sizes) consumption, plan meals and aim for a balanced plate. Again, most of these strategies can be summarized into consuming higher quality foods (more whole or minimally processed foods and less ultra-processed foods) which can be achieved by cooking more often (with non processed foods). The main significant differences in lifestyle and monitoring strategies between maintainers and regainers are that maintainers are more likely to: practice PA; monitor their weight and to record their food intake. Finally, maintainers are slightly more likely to create a healthier home food environment by limiting high-calories, high-fat, high-sugar snacks and having more fruits and vegetables ready-to-eat.

Perceived barriers to weight loss maintenance experienced by maintainers and regainers and strategies to cope with the barriers.

Individual-level barriers

Dietary behavioural barriers

A few maintainers said that **reducing portion sizes** was one of the most important strategies they employed to lose and maintain their weight, whereas regainers mentioned that reducing portion sizes was a barrier to maintaining the weight loss (they were not able to reduce the portions size). A few regainers mentioned **time** as the main barrier to maintaining their weight loss and one also said that planning meals was the main reason why they couldn't maintain their weight. **Cooking** was also reported as a barrier to maintaining weight loss by a few regainers. To cope with this barrier, a few suggestions could be to cook many recipes on the same day, and make extra to use in another meal, double your recipes and freeze them in portions.

Lifestyle and self-monitoring barriers

Maintainers confirmed that **PA** is the main strategy that helped them reach and maintain their weight, whereas, for regainers practicing PA was reported as the most common barrier to weight loss maintenance. Only two maintainers mentioned PA as a barrier; to cope with this barrier, they reported doing PA that pleased them and receiving encouragement from their support group (family, friend or personal trainer) as motivation.

Stress and quality of sleep were not related to weight loss maintenance in this study; two regainers did mention stress as a barrier to weight loss maintenance. Stress and sleep quality have been associated with weight regain (Duppert, 1984; Coughlin & Smith, 2014).

Psychosocial barriers

Emotional eating was the main barrier to weight maintenance mentioned by both maintainers and regainers but maintainers said that they coped with it by either drinking water, going for a walk, brushing their teeth, reading a book, avoiding watching TV ads, or hiding the snacks. A review conducted by Frayn & Knauper (2017) from McGill University looking at

emotional eating and weight in adults found that emotional eating greatly impacted initial weight loss but was less related to weight loss maintenance. This may be because maintainers learn how to cope with this barrier and therefore, experience it less than regainers.

Social environmental barriers

Social life was also a barrier to weight loss maintenance reported by a few maintainers; "eating at a friend's house", " eating out", and "having big family meals" as a barrier to weight loss maintenance, but to cope, they said they sometimes had to limit going out as a strategy. Having **no motivation or willpower** was often reported by regainers as a barrier to maintain the weight loss or to continue losing weight. Regainers in this study lost less weight than maintainers by the end of the intervention, and as previously discussed this may have demotivated them from maintaining their healthy habits.

Physical environmental barriers

Food temptations was a significant barrier to weight loss found among maintainers when compared to regainers. The qualitative analysis of this study confirmed this; maintainers mentioned going for a walk or brushing their teeth, not watching TV food ads, or reading a book as strategies to cope with food temptations. In an explorative analysis conducted by Green et al. (2009), researchers found that when tasty foods were present or offered to individuals, participants experienced strong impulses for food cravings. Regainers in this study also reported food temptations was a barrier to maintain the weight loss, but to a lesser extend than maintainers, and perhaps regainers simply don't notice or perceive this behaviour as a contributing factor to weight regain.

In this study, although no significant differences in the frequency of eating at fast-food **restaurants** was found between maintainers and regainers, regainers perceived eating out as a barrier to weight loss maintenance when compared to maintainers. All maintainers ate out in fast-food restaurants <1/15 days and the majority ate out in traditional restaurants 1/15 days. In the qualitative interviews, both maintainers and regainers mentioned eating out less than before; however, two regainers also mentioned eating at restaurants more often now than during their weight loss. As previously mentioned, nutritional quality in restaurants is significantly poorer than in home cooked food and portions sizes can be up to five times larger

than the standard portion size from the Food Guide Pyramid developed by the USDA (Lin & Frazao, 1997; Young & Nestle, 2002). Larger portions served in restaurants are related to higher energy consumption. In a study measuring whether increasing the portion size of a meal affects energy intake found that not only did those who purchased larger portions increase their kcal intake by 43% but overweight and obese individuals perceived no difference in portion size between a normal meal and the portion that increased by 150% (Diliberti et al., 2004). Findings from the literature review also show that maintainers report not eating in fast-food restaurants had adjusted odds of successfully maintaining their weight loss that were 62% higher than those who ate fast-food two times or more per week (Kruger et al., 2008). Thus, limiting eating at restaurants and eating out to twice per week or less may be a good behavioural strategy to maintain weight loss. Eating out was a barrier for 71.4% of regainers as compared to only 20.0% of maintainers (p=0.009). PA was also a major barrier among regainers (100.0%) as compared to 66.7% for maintainers (p=0.042). However, food temptation was a barrier for all maintainers (100.0%) and not as much for regainers (64.3%) (p=0.017).

In short, in this study, the majority of the barriers to weight loss maintenance were to practice PA, suffering from emotional eating, having no motivation, eating out and food temptations.

6.4 Limits, strengths, and avenues for future research and implications for clinical practice

This study is subject to several limitations. First, some of the qualitative questions such as, "*What knowledge related to nutrition did you acquire that has helped you the most to lose and maintain the weight?"* or "*What was your strategy to overcome an experienced barrier during your weight loss and weight loss maintenance?*" were only asked to maintainers. Therefore, no comparison could be made between the two groups and it was not possible to identify whether or not regainers had a strategy to cope with these barriers.

Second, the sample of this study is relatively small, which can limit the generalizability of the findings. However, this limitation is somewhat lessened by the qualitative aspect of this

research which enable the validation of results. Another potential limitation is that all the data were self-reported by participants. For example, all data collected regarding weight, dietary behaviour, PA, food recording, etc. were self-reported, therefore participants may have answered with more desirable responses. However, self-reported weight has been found to be accurate in normal range BMI and slightly under-reported by ≥5% in obese women but accurately identified overweight/obese women (Lin et al, 2012). The interviews were not recorded, which can introduce bias and errors but since the questions were all either dichotomous, multiple choice, or based on the Likert Scale, the potentiality of errors is limited.

Some questions, such as the ones on food quality, cooking habits and confidence and motivation levels were developed by the researcher and we not validated prior to our study.

However, those questions were verified by the director of this research and tested on a small sample of volunteers (n=5) to evaluate their readabilitt and understanding. Finally, there is a potential desirability bias inherent to the study since participants knew the researcher as their nutritionist. However, this may also be a strength of the study since participants may have felt more comfortable to speak freely about their experience given the familiarity.

This study has several strengths. First, this study used a triangulation design where the qualitative answers cross-validated the quantitative findings making it possible to go in-depth about a few topics such as dietary strategies, culinary changes, and environmental changes. Secondly, this study explored long-term weight loss strategies based on the social-ecological model, and this model shows with consistent strong evidence that implementing multiple changes at various level of the model is effective in improving dietary habits and lifestyle (Story et al., 2008). This model considers the complex interplay between individual, relationship, community, and societal factors and the interrelationship between them and based on our literature review, no present study has taken all of these factors under consideration. To date, most research on weigh loss is from the US, UK, or elsewhere. This study is the first of it's kind of look at the Canadian context specifically, and in particular, in Quebec.

This study explored long-term weight loss strategies based on three out of four levels of the social-ecological model. Future studies should include the macro-level of this model,

which includes the societal and cultural norms and values, systems (e.g., government and political structures, education, health care), organizations (e.g., public health, community), and businesses and industries (e.g., food and beverage industry, food marketing and media, food and agriculture policies). This will help health professionals understand how these levels influence to intersect and shape an individual's behaviour. By integrating a multi-level strategy model in interventions, this may increase the probability of successful weight loss maintenance. Finding strategies to cope with all the barriers perceived by both regainers and maintainers is important to lower the risk of weight regain. An interesting follow up study would be the creation of an intervention specifically tailored to the regainers group looking at whether the adoption of the coping strategies used to overcome barriers found in this study would be put into practice and result in losing and maintaining weight.

7. Conclusion

In conclusion, these findings show that weight loss maintenance is complex, multifactorial, and context dependent. To help individuals and health professionals such as dietitians to develop successful long-term weight loss maintenance interventions, it is important to understand the individual within its complex environment and the interaction between the various levels of the multi-level model. For example, the social network of an individual may have an influence on its dietary choice, as seen in this study, maintainers were more likely to have a positive support from their network, although this study didn't explore deeply how the network may have influenced the participant choices, there is definitely an interaction and an influence from it, or at least to some extend. This study also showed the link between the home environment of the individual and their dietary choice, by creating a healthier environment (less high-fat, high-sugar snacks and more ready-to-eat vegetables and fruits), it is easier for the individual to make healthier choices. Finally the individual could also have an influence on its social network, if they make changes toward better eating habits and lifestyle, it may indirectly positively influence the choices of their friends, family and colleagues and vice-versa. The dietitian could also have a positive influence on the individual, motivating them to adopt healthier eating habits, but also influence the individual to create a healthier environment (Figure 7). On the other side, as emotional eating was found to be a

barrier to maintaining the weight loss in both maintainers and regainers, it is possible that the food intake was influenced by social factors such as the influence of others or by environmental factors, such as the easy availability of food at home. The dietitian can also influence the individual to cook more often by giving them tips on tasty recipes or ways to save time in the kitchen (Figure 8).

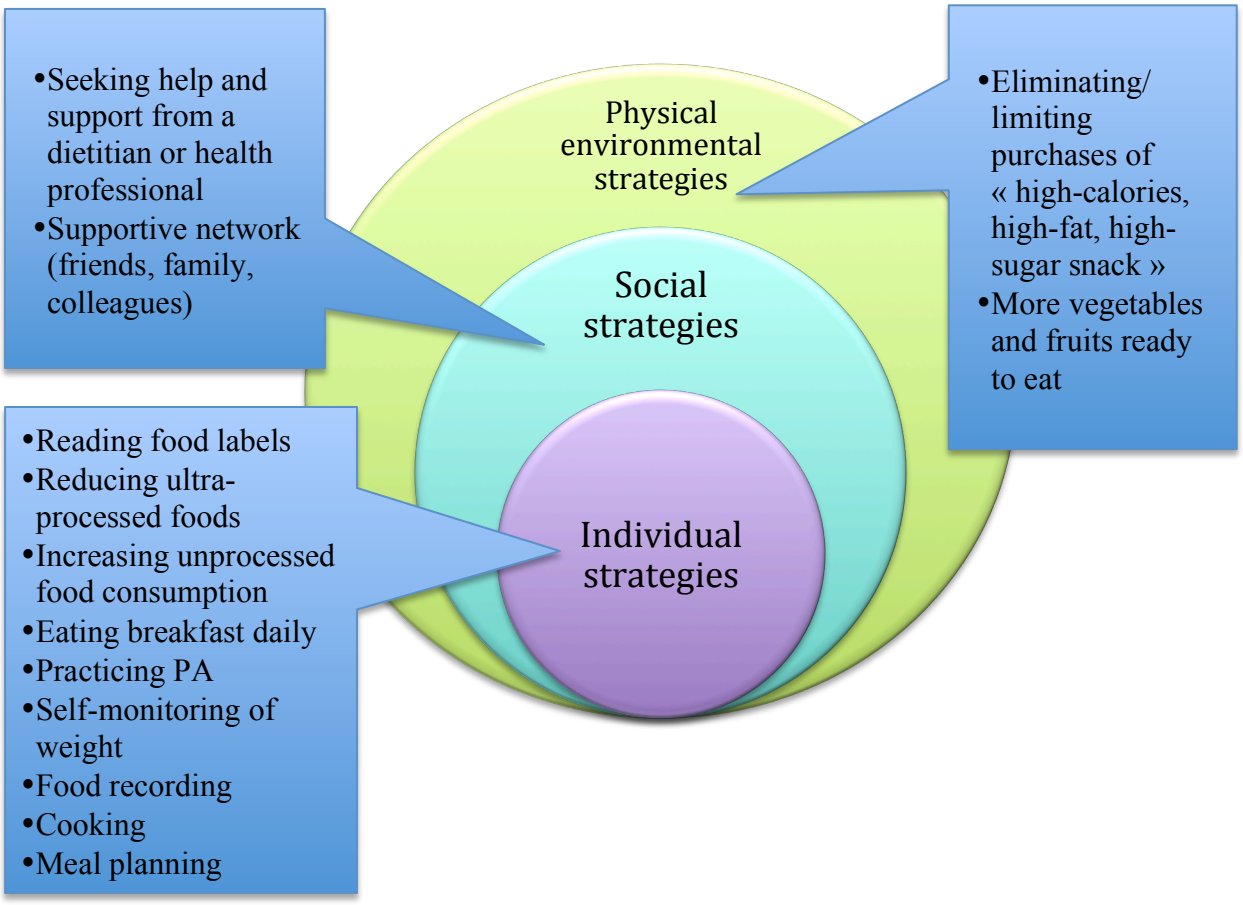


Figure 7. Strategies associated to weight loss maintenance experienced by maintainers and significant differences associated with weight loss maintenance between maintainers and regainers.

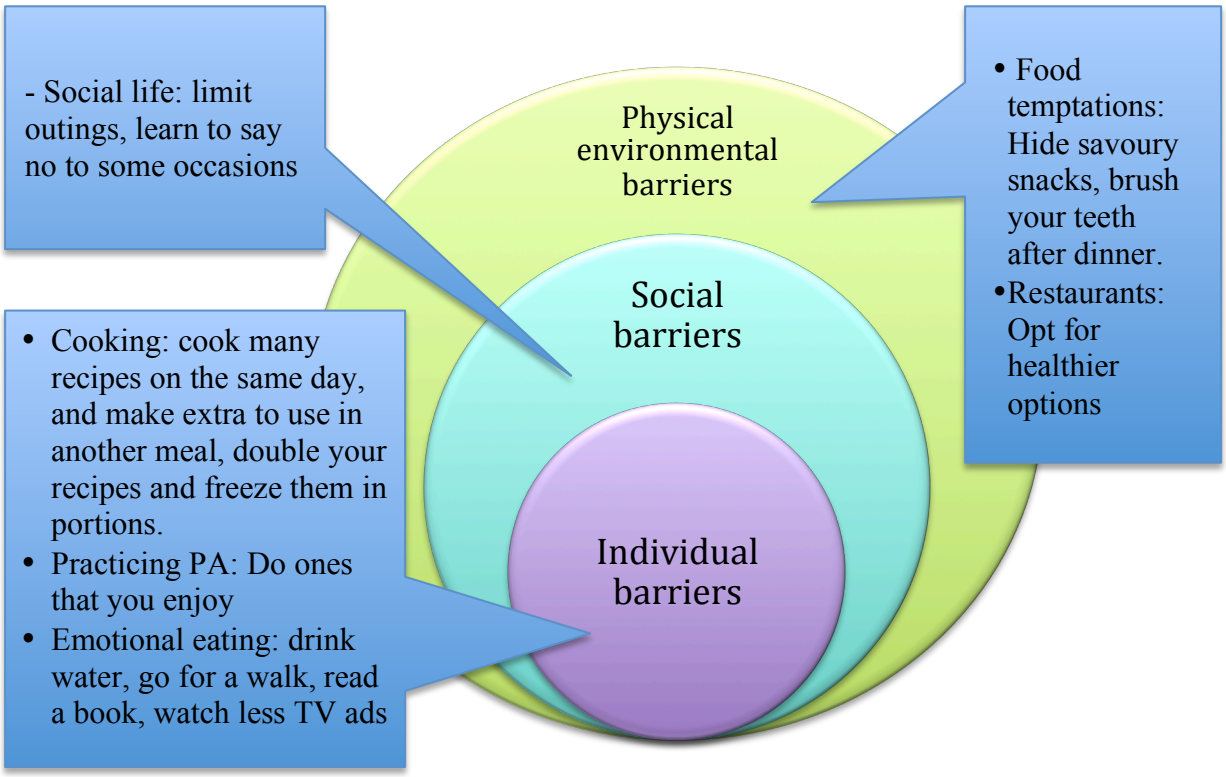


Figure 8. Perceived barriers to weight loss maintenance experienced by maintainers and regainers and strategies to cope with the barriers.

Thus, to be successful at maintaining a weight loss, it clearly requires the adoption of more than one strategy at a multi-levels. As Dr. Hull,recommends to "Choose eating habits and lifestyle that you can sustain" (Hull, 2008).. Strategies and barriers vary from one individual to another and each individual will have a different strategies to focus on depending on their life and circumstances. There is no "one size fits all strategy" for successful weight loss maintenance and some individuals may require the use of more strategies compared to others. Long-term weight loss is possible, but requires sustained behavioural and environmental changes. Diets and strategies should be directed towards those that follow basic principles closer to nature such as eating whole foods or minimally processed foods and avoidance of ultra-processed foods. Diets that can't be maintained or that lead to other unhealthy behaviours should be avoided. However, this study showed that individuals can be

successful at losing weight and keeping it off through a number of different sets of behavioural strategies, which should be considered in weight management interventions. Further exploration of the lifestyle patterns of long-term weight loss maintainers methods could be useful for determining future weight management interventions to the specific characteristics of individuals wishing to reduce their weight in the long-term. Also, further studies looking at all the levels (including macro-level) of the ecological framework and how each of these level interact with each other should be explored. By increasing the prevalence of long-term weight loss maintenance, this will directly decrease the risks of many chronic diseases (diabetes, high blood pressure, heart disease, etc.) and a number of cancers associated with obesity.

This project allowed for the exploring of behavioural strategies and barriers of weight maintenance based on the ecological model, which suggests that intervention will be most effective if they target multiple factors from the four different levels. As discussed earlier, behaviour is influenced by individual, social, physical, and macro-level environment. Although this study focused on the most proximal levels (micro-environment), it nonetheless demonstrates that to achieve long-term maintenance weight loss, multiple strategies at once should be employed and include individual and environmental strategies.

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Annex I - Questionnaire – Interview

Stratégies et défis associés au maintien de la perte de poids à long terme chez les femmes adultes québécoises en surplus de poids

Nom de la participante : **Date :**
Date de naissance : **Taille :**

	OUI	NON
Perte de poids réussie à long terme (perte de ≥5 % du poids corporel initial maintenu >1 an)		

Plusieurs questions englobant les aspects suivants vous seront posées : Caractéristiques démographiques, histoire pondérale, consommation et pratiques alimentaires, environnement alimentaire et social, motivation, confiance, connaissances en nutrition, habitudes de vie, activité physique, facteurs psychologiques.

En tout temps, vous pouvez refuser de répondre à toutes questions, et vous avez le droit de mettre fin à l'entrevue sans avoir à donner de raisons. La durée de l'entrevue est d'environ 60 minutes.

Les questions suivantes se rapportent à votre profil sociodémographique. Ces renseignements resteront confidentiels et seront utilisés uniquement à des fins de contrôle d'échantillon.

1. CARACTÉRISTIQUES DÉMOGRAPHIQUES

Quel est le niveau de scolarité le plus élevé que vous avez complété?

- ☐ Aucun certificat ou diplôme
- ☐ Diplôme d'études secondaires ou l'équivalent (AEC)
- ☐ Diplôme d'études collégiales ou DEPP
- ☐ Diplôme d'université (1 cycle)
- ☐ Cycles supérieurs (Maîtrise, Doctorat)

État matrimonial

- ☐ Mariée/conjoint de fait
- ☐ Veuve
- ☐ Séparée ou divorcé (ne vivant pas en union libre)
- ☐ Célibataire (ne vivant pas en union libre)

Statut d'emploi

- ☐ Salariée ou autonome à temps plein
- ☐ Salariée ou autonome à temps partiel
- ☐ Chômage

- [ ] Au foyer
- [ ] Retraitée
- [ ] Étudiante

2. HISTOIRE PONDÉRALE				
Avant la perte de poids				
Poids initial :	IMC:			
Poids total perdu après l'intervention avec la nutritionniste				
Poids :	IMC :			
Perte de poids total :				
Aujourd'hui				
Poids :	IMC:			
Perte de poids total :				
Maintien de la perte de poids (temps) :	% perdu :			

	OUI	NON
Avez-vous de l'obésité dans votre famille?		
Avez-vous tenté de perdre du poids en suivant un régime alimentaire dans le passé? Si oui, lequel ou lesquels?		
Suivez-vous actuellement un régime alimentaire particulier ? Si oui, lequel?		
Autour de quel âge étiez-vous en surpoids pour la première fois?		

Environ combien de lbs/kg aviez-vous perdues durant le premier mois?	0-2lbs (0-1kg)	3-6lbs (1.5-3kg)	7-10lbs (3-5kg)	11lbs + (5kg+)

SUIVIS EN NUTRITION		
1. À combien de séances avez-vous assisté avec votre nutritionniste (Karine Séguin)?		
2. Depuis la fin des séances avec Karine Séguin, à combien de séances avez-vous assisté avec une nutritionniste autre que Karine Séguin?	OUI	NON

CONSOMMATION ET PRATIQUES ALIMENTAIRES				
Depuis que vous maintenez votre perte de poids OU depuis que vous avez repris votre poids, habituellement :				
Combien de repas par jour mangez-vous (excluant les collations)?				
	JMS	PFS	SVT	TJRS
Déjeunez-vous le matin?				
Mangez-vous des collations entre les repas? Si oui, pourriez-vous nommer trois exemples de collations que vous mangez le plus souvent (nommez trois exemples populaires) :				
Grignotez-vous le soir ou entre les repas? Si oui, que grignotez-vous (nommez trois exemples populaires) :				

Apportez-vous votre lunch au travail (ou à l'école)? Pourriez-vous décrire à quoi ressemble votre lunch «typique»?				
Lorsque vous cuisinez ajoutez-vous du sel à vos aliments?				
Lorsque vous mangez, ajoutez-vous du sel à vos aliments?				
Consultez-vous le tableau de valeur nutritive des étiquettes alimentaires? Si oui, le comprenez vous?				
Prenez-vous le temps de manger?				
Avez-vous un horaire de repas stable?				
Choisissez-vous des produits céréaliers faits à partir de grains raffinés? (pain blanc, pâtes de blé raffiné, riz blanc, etc.)				
Des produits céréaliers faits à partir de grains entiers? (pain de blé entier, pâtes de blé entier, riz brun, quinoa, etc.)				
*Planifiez-vous vos repas à l'avance?				
Comptez-vous les calories?				
Surveillez-vous la qualité des aliments que vous consommez?				
Surveillez-vous la quantité des aliments que vous consommez?				
À la maison, avez-vous des grignotines sucrées ou salées (barres de chocolat, croustilles, biscuits sucrés, maïs soufflé au beurre, bonbons, etc.)?				
Gardez-vous à la maison des aliments dont vous avez de la difficulté à contrôler la consommation?				
Mangez-vous vos émotions?				

Pour les prochaines questions, répondez par :

1. Jamais (<1 fois par mois)
2. 1 fois/ mois
3. 1 fois/ 2 semaines
4. 1 à 2 fois/ semaine
5. 3 à 4 fois/ semaine
6. 5 à 7 fois/ semaine
7. Tous les repas

À quelle fréquence consommez-vous/ mangez-vous :

	1	2	3	4	5	6	7
Dans un restaurant de type *fast food* (grandes chaînes de restaurant telles que McDonald, Tim Horton, Subway, Thai Express, etc.)?							
Dans un restaurant autre que *fast food* ?							
Des mets prêts-à-manger ou des repas surgelés? (Pizza, mets italiens ou chinois, riz et pâtes alimentaires assaisonnés…)?							
Des charcuteries? (bacon, saucisse, saucisson de Bologne, salami, peppéroni, pâté de foie, cretons, croquettes, côtes levées pré-préparées)							
Des mets frits (frites, légumes tempura, poulet frit, poisson frit, etc. ?							

Des fruits au dessert?							
Du dessert autre que des fruits?							
Des aliments de boulangerie achetés en magasin? (beignes, brioches, croissants, danoises, muffins, biscuits, etc.)							
Des aliments sucrés? (bonbons, barres de chocolat, crème glacée, gâteaux, tartes, etc.)							
Des soupes, bouillons ou sauces, en sachet ou en conserve?							
Des grignotines salées autre que des noix et des graines? (craquelins, croustilles, maïs soufflé autre que nature, bretzels, etc.)							

	1	2	3	4
Combien de portions de légumes consommez-vous par jour? (1 portion = 1 légume moyen, 1/2 tasse légumes frais, surgelés ou en conserve, 1 tasse de laitue, 1/2 tasse jus de légumes)	≤1/j	2 à 3/j	4 à 6/j	≥7/j
Combien de portions de fruits consommez-vous par jour? (1 portion = 1 fruit moyen, ½ tasse fruits frais ou surgelés)	≤1/j	2 à 3/j	4 à 6/j	≥7/j
Quelle quantité de boissons sucrées excluant les boissons gazeuses buvez-vous? (jus ou boisson aux fruits, thé glacé, limonade, lait au chocolat…)	Zéro	≤2 verres (16oz/ sem	≤1 verre (8oz)/ j	>1 verre (8oz)/j
Quelle quantité de boissons gazeuses régulières buvez-vous?	Zéro	≤2 verres (16oz/ sem	>2 verres à ≤1 verre (8oz)/ j	>1 verre (8oz)/j
Quelle quantité de gazeuses diètes buvez-vous?	Zéro	≤2 verres (16oz/ sem	>2 verres à ≤1 verre (8oz)/ j	>1 verre (8oz)/j
Quelle est votre consommation moyenne d'alcool par semaine (1 consommation = 5 oz de vin, 1 bière 341ml, 1 ½ oz de spiritueux)?	Zéro	≤1/j	2/j	≥3/j
Quels types de matières grasses utilisez-vous le plus souvent en cuisson?	Huile végétale	Beurre ou lard NH	Shortening, margarine	Autre :
Décrivez à quoi ressemble votre assiette typique en terme de **portions** et de **choix alimentaires** (proportion de viande et substituts, produits céréaliers, fruits et légumes, gras)				

ENTOURAGE			
La majorité du temps, mangez-vous : 1. Seul 2. En compagnie			
	1	2	3 (Spécifiez)
Votre déjeuner			
Votre dîner			
Votre souper			

LIEU DE CONSOMMATION					
La majorité du temps, où mangez-vous : 1. À la table à manger 2. Devant un écran (télévision, ordinateur, ipad) 3. Sur la route (dans la voiture ou en transport en commun) 4. Sur le coin sur comptoir 5. Autre. Spécifiez					
	1	2	3	4	5 (Spécifiez)
Votre déjeuner					
Votre dîner					
Votre souper					

HABILETÉS CULINAIRES					
Cuisinez-vous?				Oui	Non
Si oui, à quelle fréquence?	Tous les repas	Tous les jours	Deux à cinq fois/ sem	Une fois/ sem	
Combien de temps en moyenne consacrez-vous à la préparation d'un repas?					
Comment qualifieriez-vous votre niveau de compétences culinaires? (échelle de 1 à 5, 1 étant faible, 5 étant élevé)					
Parmi les choix suivant, comment avez-vous acquis vos compétences culinaires?	Parents	Amis	Cours de cuisine	Recettes en ligne/ livres	Autre (Spécifiez):

ENVIRONNEMENT ALIMENTAIRE		
	OUI	NON
Est-ce qu'il y a des aliments interdit d'acheter ou d'avoir à la maison? Si oui, lesquels?		

ENVIRONNEMENT SOCIAL		
	OUI	NON
Est-ce que vos collègues, amies et/ou famille savaient que vous étiez en perte de poids ou que vous essayiez de changer vos habitudes alimentaires?		
Est-ce que vos collègues, amies et/ou famille comprenaient et respectaient vos choix alimentaires?		
Si oui, vos collègues vous ont-ils encouragés ou soutenus?		
Si oui, vos amis vous ont-ils encouragés ou soutenus?		
Si oui, votre famille vous soutenait-elle et vous encourageait-elle?		

COHÉRENCE		
	OUI	NON
Avez-vous tendance à manger plus sainement ou de façon plus « stricte » durant la semaine et à laisser plus de flexibilité la fin de semaine Si oui, spécifiez :		

CONFIANCE & MOTIVATION	
Sur une échelle de 1 à 5 (1 étant faible, 5 étant élevé) répondez aux questions suivantes :	
À quel point étiez-vous persuadé d'atteindre vos objectifs de perte de poids?	
À quel point étiez-vous motivé à perdre du poids?	
À quel point était-ce important d'atteindre votre objectif?	
À quel point était-ce important de changer vos habitudes alimentaires?	

CONNAISSANCE EN NUTRITION		
	OUI	NON
Lisez-vous ou regardez-vous des émissions au sujet de la nutrition? Si oui, lequel ou lesquelles?		
Suivez-vous les réseaux sociaux au sujet de la nutrition ou faites-vous partie d'un groupe de nutrition ou un groupe de soutien pour la perte de poids? (Facebook, Instagram, etc.) Si oui, lequel ou lesquelles?		
Avez-vous déjà suivi des cours de nutrition?		

HABITUDES DE VIES						
					OUI	NON
Faites-vous régulièrement de l'activité physique?						
Si oui, combien de minutes d'activité physique faites-vous par semaine environ?						
Tenez-vous ou avez-vous tenu un journal alimentaire?						
Si oui, pendant combien de temps?	1 jr ≤ à ≤1 sem	>1 sem à ≤1 mois	>1 à ≤3 mois	Toujours	Intermittent	
Est-ce que vous-vous pesez régulièrement?						
Si oui, à quelle fréquence?	1 fois/ mois	1 fois/ sem	Plusieurs fois/ sem	À tous les jours		
Combien d'heures par semaine passez-vous devant les écrans excluant les heures de travail (ordinateur, portable, télévision, cellulaire)?	<1 h/ sem	1 à 3 h/ sem	0.5 à 1 h/ j	>1 à 2 h/ j	>2 à 3 h/ j	>3 h/ j

BIEN-ÊTRE	
Sur une échelle de 1 à 5 (1 étant faible, 5 étant élevé) répondez aux questions suivantes : À combien évaluez-vous la qualité de votre sommeil?	
À combien évaluez-vous votre niveau de stress en moyenne?	

FACTEURS PSYCHOLOGIQUES				
			OUI	NON
À tout moment, avez-vous déjà eu des problèmes de dépression, d'anxiété ou d'autres émotions qui ont perturbé votre fonctionnement normal?				
Souffrez-vous d'un trouble alimentaire (boulimie, hyperphagie, anorexie, etc.)?				
Comment qualifieriez-vous votre humeur en générale?	Excellente	Bonne	Mauvaise	

DÉFIS DU MAINTIEN OU NON DE LA PERTE DE POIDS.		
Parmi les facteurs suivants, lequel ou lesquels ont représenté un défi dans le maintien de votre poids?		
	OUI	NON
Prix des aliments		
Disponibilité/ Accessibilité		
Information nutritionnelle		
Manque de temps		
Manger à l'extérieur		
Stress		
Manger ses émotions		
Influences des autres		
Cuisiner		
Tentations		
Activité physique		

STRATÉGIES/ DÉFIS CLÉS DU MAINTIEN OU NON DE LA PERTE DE POIDS.		
MAINTIEN	OUI	NON
Continuez-vous à faire des efforts pour manger de façon saine et équilibrée?		
Avez-vous eu une rechute pendant votre perte de poids (retour aux mauvaises habitudes alimentaires ou reprises de poids)?		
Quelles nouvelles connaissances en nutrition vous ont le plus aidé à atteindre et à maintenir votre perte de poids?		
Selon vous, quel est un des éléments les plus importants qui vous a aidé à atteindre et à maintenir votre perte de poids ?		
Quels sont les éléments qui ont été les plus difficiles à surmonter durant votre perte de poids et votre maintien? Quel a été votre stratégie pour surmonter cette difficulté?		
Sur une échelle de 1 à 5 (1 étant faible, 5 étant élevé), à quel point vous avez trouvé le processus de perte de poids et de changements d'habitudes alimentaires difficile (efforts à mettre)?		
NON MAINTIEN DE LA PERTE DE POIDS		
Selon vous, pour quelles raisons avez-vous de la difficulté à maintenir le poids perdu ?		

Annex II – Qualitative questionnaire

Pour les quatre questions suivantes, pourriez-vous décrire les changements que vous avez faits depuis le début de votre démarche de perte de poids jusqu'à aujourd'hui? Si vous n'avez pas fait de changement, SVP mentionnez-le.

1. Quels sont les principaux changements que vous avez apportés à votre **panier d'épicerie (à vos achats alimentaires)**?

2. Quels sont les principaux changements que vous avez apportés à votre **consommation alimentaire**?

3. Quels sont les principaux changements que vous avez apportés à vos **habitudes culinaires**? (par exemple, prendre plus ou moins de temps à cuisiner des repas, etc.)

4. Qu'avez-vous modifié dans **l'environnement alimentaire** de votre maison? (par exemple, ranger les grignotines dans l'armoire plutôt que de les laisser sur la table ou à la vue, exposer un plat de crudités sur la table plus fréquemment, etc.)

Annex III – Qualitative answers analysis

Question 1: Décrivez à quoi ressemble votre assiette typique en terme de portions et de choix alimentaires (proportion de viande et substituts, produits céréaliers, fruits et légumes, gras)

MAINTAINERS	REGAINERS	Segments/ citations	
		Maintainers	Re-gainers
Assiette équilibrée selon le GAC : -assiette santé : 3-4 oz de viande et substituts + 0.5 tasse produits céréaliers et 1 tasse de légumes (demie-assiette) -6oz de viande ou poisson et 1.5 tasse de légumes (moitié de l'assiette) et 0.5-0.75 tasse cuit de produits céréaliers + 1c. à soupe max d'huile -viande et substituts (3-4oz) + moitié légumes (min. 1 tasse) et ¼ de produits céréaliers (riz, pâtes, etc.) environ 0.5 tasse et 1 fruit en dessert -paume de main pour la viande, 0.5 tasse de féculents, 1 tasse de légumes et 1 tasse de fruits (moitié de l'assiette) - ½ assiette de légumes (1 tasse et +) + viande paume de main+ 0.5 tasse de riz cuit -tasse légumes (demie-assiette) + substituts de viande (2 oeufs) ou 45g de fromage allégé + 0.5 tasse féculent -paume de main viande (90g) + 0.5 tasse de riz + 1 tasse de légumes (demie-assiette) -1 tasse de légumes (½ assiette) + 0.5 tasse de féculents + 4-5 oz de viande -moitié légume (2 tasses) et moitié viande et substituts (2 jeux de carte) le midi et idem **le soir** mais avec ¼ de	Assiette équilibrée selon le GAC : -3 oz de viande + 0.5 tasse en produits céréaliers et demie-assiette de légumes -4 à 6 oz de viande + 1 tasse salade (½ assiette) + 0.5 tasse de riz -moitié légumes (1 tasse et +) et 4-6oz viande et 0.5 tasse de riz ou moins - ½ assiette de légumes (1 tasse) + ¼ en viande et subs. (4-5 oz) + ¼ en produits céréaliers (0.5 tasse de riz) - ½ assiette de légumes (1 tasse) + viande 4oz et 0.5 tasse de féculents -6oz de viande + 1 tasse de légumes (demie-assiette) + 1 petite patate ou 0.5 tasse de riz -demi-assiette légumes + 6oz de viande + 0.75-1 tasse de riz ou quinoa - 1 à 2 tasse de légume (½ assiette) + 1 patate ou 1 tasse de riz + 6 oz de viande et substituts -légumes (1 tasse – demie-assiette) et source de protéine 1 saucisse ou 6 oz de viande + 1 tasse de pâtes ou féculents -2 tasse de légumes (demie-assiette) + 1 poing de tofu ou ¼ en substituts de viande et 1-1.5 tasse de pâtes ou de riz - ½ de l'assiette en légumes (1 tasse), ¼ de l'assiette de féculents (riz 1 tasse et +) et ½	**12**	**10**

l'assiette en féculent (0.5 tasse) et ¼ en viande et substituts. -100g de viande et substituts+ 1 tasse de légumes et parfois un produits céréaliers (¼ de l'assiette) - ¾ de l'assiette en salade/ légumes et ¼ en viande et substitut et parfois ¼ de l'assiette en féculents -moitié de l'assiette en légumes (2 tasses et +) + 4oz de viande et parfois 0.5 tasse de féculents -un steak 8oz + salade demi-assiette et parfois une-demie tasse de riz	assiette de viande (grosseur de la main au complet)		
Assiette de légumes + viande et substituts -légumes au moins 1 tasse + 5 oz de viande ou poisson -2 tasses de légumes (salade) et 6oz de poisson -moitié légume (2 tasses) et moitié viande et substituts (2 jeux de carte) **le midi** et idem le soir mais avec ¼ de l'assiette en féculent (0.5 tasse)		**3**	**0**
	Assiette sans légumes -4oz de viande + 1 tasse de riz (ou beaucoup de pâtes), **pas** de légumes -3 oz viande + 1 tasse de patates, aucun légumes -beaucoup de pâtes pré-préparés, lasagne, riz minute + fromage + 3-4 oz de viande parfois	**0**	**3**

Question 2 : Quelles nouvelles connaissances en nutrition vous ont le plus aidé afin de perdre votre poids et de le maintenir?

Stratégies – Maintainers	Segments/ citations
Substitutions d'ingrédients culinaires dans les recettes - substitutions d'ingrédients culinaires dans les recettes	1
Réduire les portions - réduire les portions dans les assiette	1
L'équilibre des repas - l'équilibre des repas	1
Étiquettes nutritionnelles - lipides, étiquettes nutritionnelles - les macronutriments, leur définitions et leurs rôles, les étiquettes nutritionnelles - lecture des étiquettes - étiquettes nutritionnelles - meilleur choix alimentaires, les connaitre, lire les étiquettes nutritionnelles - lecture des étiquettes - étiquettes nutritionnelles, nouveaux outils tel que les choix alimentaires - manger des fibres et des protéines, des aliments soutenants	8
Les collations équilibrées - combinaison alimentaire collation - le bon choix des collations	2
Grains entiers - consommer les grains entiers	1
Rien - rien	1
Journal alimentaire - le journal alimentaire	1

Question 3: Selon vous, quel est un des éléments les plus importants qui vous a aidé à atteindre et à maintenir votre perte de poids ?

Stratégie – Maintainers	Segments/ citations
Activité Physique - activité physique - l'activité physique - activité physique, - activité physique - activité physique - activité physique - activité physique - activité physique - activité physique - activité physique	10
Réduire les portions - diminuer les portions - réduire les portions - réduire les portions	3
Motivation - la motivation - les objectifs (bikini) - les vêtements	3
Suivi en nutrition - suivi pas une nutritionniste - le soutient de sa nutritionniste et de son entraîneur - suivi en nutrition - suivi en nutrition - et les suivis en nutrition	5
Soutien/ encouragement de l'entourage - conseils de ses amies en nutrition, partage de recettes - soutien au travail – collègue - ses amies qui s'encourage	3
Aucun stress - pas de stress	1
Avoir du temps - temps sabbatique	1
Défi Santé au travail - défi Pierre Lavoie, Kilo Cardio 2	1
Préparer un lunch - faire son lunch pour aller au golf	1

Diminuer les produits céréaliers - éliminer le pain - Manger moins de féculents	2
Cesser les diètes à court terme - arrêter les diètes non maintenable	1
Se sentir rassasiée - se sentir rassasiée	1
Consommer plus de légumes - manger plus de légumes - manger plus de fruits et légumes - plus de légumes	3
Consommer moins de matières grasses - moins de matières grasses	1
Préparer les légumes à l'avance - manger plus de fruits et légumes et les préparer	1
Bien manger - alimentation, bien manger - bonne alimentation	2
Contrôler sa glycémie - le contrôle de la glycémie	1
Faire un journal alimentaire - journal alimentaire au départ	1
Prendre son poids - achat d'une balance pour se peser	1

Question 4 : Quels sont les éléments qui ont été les plus difficiles à surmonter durant votre perte de poids et durant le maintien de votre poids? Quelle a été votre stratégie pour surmonter cette difficulté ? (maintainers)

Barrières - Maintainers	**# quotes**	**Stratégies - Maintainers**
Travail - Le retour au travail	1	
Activité Physique - Activité physique - Le retour au gym, maintenant c'est facile	2	Activité physique plaisante -Continuer d'aller à la danse, et faire des tâches ménagères (jardiner, faire des choses qui lui plait, de la raquette en hiver). Mettre des vêtements qui sont plus petits qu'elle ne pouvait plus mettre avant et que maintenant elle

		peut les remettre. Encouragement/ support de l'entourage - conseils de son ami, elle se disait qu'elle devait être encouragé par son ami pour ne pas le décevoir
Temps - le manque de temps	1	Planifier les repas à l'avance -planifier les repas
L'ennui -température dehors, l'ennui, le travail à la maison	1	Sortir manger ailleurs - Sortir manger ailleurs
Les émotions/ les rages/ le grignotage - les émotions - manger ses émotions - les rages de sucres - le sucre - arrêter de manger des cochonneries, achetais plus du tout et après un peu plus - le grignotage des chips - grignotage le soir	7	Se parler à soi-même -regarder des photos d'elle-même, se parler à elle-même Boire de l'eau - boire un verre d'eau, -boire de l'eau Prendre une marche -marcher Se brosser les dents -se brosser les dents. Ne pas regarder la télévision -Ne pas écouter la télévision avec des publicités de nourritures, Lire un livre -lire un livre Mieux dormir - travaille à améliorer son sommeil Cacher les grignotines - essayer de les cacher ou les substituer par autre chose
La vie sociale - la vie sociale et son impact - manger chez les gens, ailleurs - gros repas de famille	3	Limiter quelques sorties sociales -limiter quelques sorties
Ne pas sauter de repas -Dîner au travail et de prendre le temps de manger son dîner	1	Encouragement/ support de l'entourage -conseils de son ami, elle se disait qu'elle devait être encouragé par son ami pour ne pas le décevoir
Tentations - tentations	3	Mieux dormir - travaille à améliorer son sommeil

- tentations des autres - tentations.		Prendre une marche - marcher Se brosser les dents - se brosser les dents. Ne pas regarder la télévision - Ne pas écouter la télévision avec des publicités de nourritures, Lire un livre - lire un livre
Faim - avoir faim	1	Boire de l'eau - boire de l'eau Consommer plus de légumes - manger plus de légumes.
L'assiduité - La constance, dîners	1	
Le stress	1	

Question 5. Selon vous pour quelles raisons avez-vous de la difficulté à maintenir le poids perdu ? (Regainers)

Barrières – Regainers	Segments/ quotes
Activité physique -arrêt de l'exercice - activité physique - manqué de rigueur avec l'activité physique, arrêté de faire de l'activité physique - activité physique - déteste l'activité physique - activité physique - activité physique - manque d'efforts physique -activité physique.	9
Réduire les portions - de plus grosses portions - et portions - les portions trop grande	3
Motivation/ volonté/ fatigue - perdu la motivation - démotivation trop long, mais refuse la chirurgie - pas de motivation - aucune volonté - fatigué	5
Stress - hospitalisation de son père, le stress,	2

- et le stress	
Le temps - manque de temps - manque de temps - manque de temps	3
Ménopause -les changements hormonaux, la ménopause	1
Le travail - le travail qui prend de place	1
Les restaurants - les restaurants	1
Les émotions/ les rages - manger ses émotions - manger les émotions - manger ses émotions - émotions - manger les émotions - contrôle du grignotage	6
L'assiduité - constance, se gâter et revenir aux bonnes habitudes	1
Conjoint qui cuisine - elle c'est son conjoint qui cuisine, pas de légumes	1
Tentations - tentations - grignotage le soir - tentations des desserts	3
Médicaments - médicaments	1
Ne sait pas - Ne sait pas comment en perdre, pas la bonne méthode - Ne sait pas	2
Calculer les calories - taner de calculer les calories	1
Cuisiner - n'aime pas cuisiner - cuisiner	2
Consommer des aliments transformés - mange des aliments transformés	1
Planification des repas - pas planifier les repas	1

Se priver, la restriction -difficulté à tout couper	1

QUESTION 1 : Quels sont les principaux changements que vous avez apportés à votre **panier d'épicerie (à vos achats alimentaires)**?

MAINTAINERS	**REGAINERS**	**Segments/ quotes**	
		Maintainers	**Re-gainers**
Augmentation de l'achat de produits frais ou minimalement transformés : -Plus de produits naturels Plus de fruits et légumes (8): -J'achète beaucoup plus de produits frais, fruits et légumes -Je reste concentrée sur les fruits et légumes -J'ai augmenté notre quantité de légumes -J'ai changé mon panier d'épicerie pour des aliments plus nutritive comme plus de légumes, fruits. -Plus de légumes -Achat plus important de légumes frais et de saisons -J'achète plus de fruits et légumes à chaque semaine, -plus de légumes Yogourt nature (1) : -j'ai ajouté du yogourt grec nature Noix (1): - achat de noix Viandes et substituts (3) : -Achat d'œufs -Je reste concentrée sur les viandes et substituts - plus de poulet et porc Plus de poissons (2) : -plus de poisson (2 de plus) -J'ai augmenté notre quantité de poisson	**Augmentation de l'achat de produits frais ou minimalement transformés :** Plus de fruits et légumes (4) : -Plus de fruits et de légumes -J'achetais déjà beaucoup de fruits et légumes et j'en achète encore plus, -Maintenant la grande majorité de mes achats sont des légumes des fruits -Beaucoup de légumes Plus de poisson (2) : - j'achètes plus de poisson. - j'achète plus de poissons. Viandes et substituts (1) : -Maintenant la grande majorité de mes achats sont de la viande.	**16**	**7**
Changer la fréquence ou la méthode de faire	**Changer la fréquence ou**	**2**	**3**

l'épicerie : -Le principal changement que j'ai apporté à mon panier d'épicerie est que j'ai fait l'épicerie. -Va à l'épicerie 2 a 3 fois par semaine à la place d'un seul panier bondé....	**la méthode de faire l'épicerie:** -Un on fait l'épicerie toutes les semaines au lieu d'a la dernière minute. On s'en tient à notre liste -Je fais maintenant le tour de l'épicerie sans faire les allées excepté pour certains articles. Avant la grande majorité de mon épicerie était dans les allées - J'évite les allées centrales de l'épicerie		
Diminuer l'achats d'aliments ultra-transformés: -Moins d'aliment transformer Moins de grignotines (6) : -Pratiquement plus de « cochonneries » . (Chips) -J'ai réduit l'achat de chips -moins de grignotines -je n'achète plus de : chips, craquelins -Pas de chips - je n'achète plus de chips Moins de friandises, pâtisseries, boissons sucrées (6): -Pratiquement plus de Biscuits du commerce, Chocolat -J'ai réduit l'achat de biscuits. -J'achète moins des sucreries. Je n'achete plus de chocolat, -je n'achète plus: -Bonbons, -Biscuits, - Et je n'achète plus des gâteaux, crème glacé ou d'autres gourmandise, de barre de chocolat, muffins déjà fait du magasin.	**Diminuer l'achats d'achats d'aliments ultra-transformés:** Moins de grignotines (2) : -moins de grignotines - J'achète le principale ce que j'ai besoin, beaucoup moins de cochonnerie. Moins de boissons sucrées (2) : -moins de liqueurs -beaucoup moins de liqueur. Moins de friandises, pâtisseries, boissons sucrées (1) : -on achète aucun	**17**	**8**

-pas de chocolat (sauf noir à 70% et plus), pas de boisson gazeuses Moins de charcuteries (1) : -moins de charcuteries Moins de mets préparés (3) : -Je n'achète plus de mets déjà cuisinés ou congelés... -Moins de mets préparés. - je n'achète plus:Aliments congelés (pizza, repas weight watchers ou menu bleu)	produit transformé des biscuits et des petits gateaux vachon Moins de mets préparés (3): - on achète aucun produit transformé comme le kraff diner ou ou des pizzas congelé - préférant cuisiner moi-même plutôt que d'acheter des repas préparés. -j'achète moins d'aliments préparé, je les fait moi même.		
Réduire/ substituer/ augmenter l'achat d'un produit reformulé au niveau des nutriments - je lis les étiquettes maintenant. Je mange les barres tendres autre marque que j'avais l'habitude. Produits moins sucrés (4) : -J'essai de choisir les aliments avec moins ou pas de sucre. Yogourt grec nature, lait d'amande sans sucre -j'achète des aliments à basse matière de sucré Par exemple je prends les céréales à base teneur de sucre, - J'ai changé mes desserts pour des morceaux de chocolat noir -J'essai de choisir les aliments avec moins ou pas de sucre: yogourt grec nature Produits moins gras (3): -je n'achète plus, fromages gras -je prend les fromages légers -Je fais attention à la matière grasse, des aliments à basse matière de gras : Par	**Réduire/ substituer/ augmenter l'achat d'un produit reformulé au niveau des nutriments** -je fais plus attention aux étiquettes, j'essaie de faire de meilleurs choix Produits moins gras (1) : -je mange les fromages moins gras Plus de protéine (1): -Je mange des céréales avec protéines Moins de produits salés (1) : - On achète des produits sans sel ajouté ou moins de	**9**	**4**

exemple je prends le lait 1% ,le yogourt 0% naturel les fromages légers, les viandes moins grasses, Je ne prends plus de croisant Plus de protéine (1) : - Je fais attention au nombre des protéines, Par exemple je prends le lait 1% ,le yogourt 0% naturel	sel pour les bouillons		
Lecture des étiquettes nutritionnelles: - Je vérifie maintenant les valeurs nutritionnelles des produits. Je m'intéresse particulièrement aux lipides, glucides et protéines. - Je compare les valeurs nutritives de touts les aliments achetés -vérifie les ingrédients des produits achetés.	**Lecture des étiquettes nutritionnelles**: -je lis les étiquettes maintenant -je fais plus attention aux étiquettes, -Lorsque j'achète des produits transformés je regarde les étiquettes, favorisant les aliments le plus équilibrés possible.	**3**	**3**
Acheter moins de viande rouges : -Moins de viande rouge (Au moins 3 repas de viande rouge de moins -moins de viandes rouges. -réduction d'achat de la viande rouge chez notre bouché	**Acheter moins de viandes rouge:** -Je n'achète donc plus de viande.	**3**	**1**
Substitution/réduction des produits céréaliers raffinés pour des grains entiers : -je n'achète plus: Pains blancs et pâtes blanches ajouté des triscuits.	**Substitution/ réduction des produits céréaliers raffinés pour des grains entiers :** -je mange des pâtes de blé entier	**1**	**1**
Achat d'aliments plus nutritifs : J'achète beaucoup plus d'aliments nutritifs		**1**	**0**
	Acheter un format plus		**1**

	petit d'un produit : -Aussi, j'étais du genre à m'acheter un gros sac de croustilles et de passer au travers en 2 jours. Maintenant, lorsque j'ai envie d'en manger, je m'achète un petit sac et je me contente de ça.		
	Aucun changements : -Aucun changement n'a été apporté à mon panier d'épicerie, et je dirais que c'est pire qu'en 2014 -Aucun, mes aliments sont de bons choix généralement. -je n'ai pas apporter de changement	**0**	**3**
	Plus d'achats de mets transformés: -Comme c'est mon conjoint qui fait l'épicerie et lui mange toujours la même chose, c'est donc pareil pour moi. Il m'achète souvent des plats préparés d'avance, fait maison à l'épicerie où des plats Cuisine minceur pour mes lunchs. Avant je	**0**	**1**

	travaillais à l'hôpital et je prenais mon dîner à la cafétéria, (très bons repas) mais depuis plus de 2 ans, je travaille toujours au CISSSL, mais dans une bâtisse sans cafétéria, donc le midi c'est Cuisine minceur		
	Moins d'aliments à frire : - Et achète rien à frire on c débarrassé de la friteuse.	**0**	**1**

QUESTION 2 : Quels sont les principaux changements que vous avez apportés à votre **consommation alimentaire**?

MAINTAINERS	**REGAINERS**	**Segments/ quotes**	
		Maintainers	**Re-gainers**
Consommer moins d'aliments ultra-transformés: -j'ai arrêter de consommer plusieurs produits transformés Moins de charcuteries (3) : - Moins de charcuteries : - peu de charcuterie. - mange pratiquement plus de charcuteries Moins de repas préparés (2): - J'ai complètement éliminer les repas préparés. - réduction importante des aliments contenant du sucre comme les repas préparé;	**Consommer moins d'aliments ultra-transformés:** Moins de repas préparés (1): -j'ai supprimer certains aliments de mon alimentation, comme : Muffins, certains pains, tourtière, pâté au poulet, entre autres. Diminuer les boissons sucrées /aliments sucrés (2): -j'ai beaucoup diminuer les boissons gazeuses -J'ai toujours des fruits et des légumes en collation au lieu de chocolat ou	**7**	**3**

Moins de boissons sucrées ou sucres raffinés (1) : - je ne bois plus du Cola, Sprite. Moins de sucreries (1) : - réduction importante des aliments contenant du sucre	pouding ou chips.		
Moins de restaurants: -Plus de repas au restaurant. Avant je pouvais manger deux repas par jour au restaurant. Grande consommatrice de restauration rapide. -sushis..va moins au resto..... -cessation de la mal bouffe, cessation des restos à chaque semaine;	**Moins de restaurants:** -moins de resto -et vais moins souvent au restaurant.	**3**	**2**
Augmenter la consommation d'aliments frais ou minimalement transformés : Plus de légumes (3): -J'ai augmenté ma quantité de légumes au dîner (salade)... -plus de legume plus -plus de repas à base de salade verte...mes portions de légumes, changé la pizza all dress pour aux légumes.. Plus de fruits (1) : -plus de fruit Plus de grains entiers (1): - plus d'aliment enrichie de fibre gruau au grain entier, je rajoute souvent aussi des graine de chia dans mes yogourts Plus de poisson (1):	**Augmenter la consommation d'aliments frais ou minimalement transformés :** Plus de légumes (5) : -je place dans l'assiette plus de légumes -Les fruits et les legumes sont maintenant la moitié et plus de mon assiete a chaque repas. -Manger plus de légumes -plus de légumes. - Sa c'est plus difficile par contre j'essai de manger plus de légumes, en mettre dans la moitié de l'assiette au lieu du quart ou moins. J'ai toujours des fruits et des légumes Plus de poisson (1): -Je manges un peu plus de poissons, thon au citron	**6**	**6**

-J'ai augmenté ma consommation de poisson.....	ou aux tomates séchées		
Boire plus d'eau : -Boire de l'eau plus souvent -J'ai aussi augmenté ma quantité d'eau -J'ai augmenté ma consommation d'eau -boire de l'eau avant les repas;	**Boire plus d'eau:** -J'essaye de boire plus d'eau,. - J'essaie aussi, lorsque j'ai une envie de salé ou sucré, de boire de l'eau à la place ou de faire une activité qui me fera oublier cette envie.	**3**	**2**
Faire ses lunchs: -Je fais toujours mes lunch que j'apporte au travail.		**1**	
Manger à des heures régulières: -J'ai mangé à des heures fixes	**Manger à des heures régulières:** -je fais des efforts pour manger à des heures plus régulières	**1**	**1**
Réduire les portions: -avant j'avais tendance à manger que mes trois repas, mais je mangeais beaucoup trop. Je mange au repas des portions normales et j'ajoute des collations au courant de la journée - Je m'assure de consommée tout les aliments nécessaire quantités de chaque aliments et portions par jour - réduction des portions - Portions pour chaque groupe alimentaire : je porte attention aux portions que j'essaie de respecter -je n'achète plus des gros gâteaux, mais plutôt des petits cakes de temps en temps	**Réduire les portions :** -Pour les portions moins grosse dans la viande, et les féculents, -J'ai réduit mes portions	**5**	**2**
Moins de produits céréaliers: - j'ai réduit le nombre de carbohydrates. - j'ai diminué les portions de pain.ex: si mange un hot	**Moins de produits céréaliers:** -moins de "p" -et moins de patates, riz et pâtes. certains pains, tourtière, pâté au poulet,	**6**	**2**

chicken je ne mets plus la tranche du dessus..mange pratiquement plus de pâtes..de riz.. - Diminution des féculents - Moins de riz, couscous et pâtes (quantité dans l'assiette) - Je ne mange plus des pâtes, du pain blanc, - Moins de riz, couscous et pâtes	entre autres. **Augmentation de la consommation des grains entiers** (1) -je mange des pâtes de blé entier		
Ne pas manger à certaines heures: - Et j'essai de ne pas manger après souper. - cessation de manger entre les repas ou en soirée	**Ne pas manger à certaines heures (1) :** -Bref, j'ai quand même arrêter de manger après 19h max	**2**	**2**
Prise de collations: - j'ajoute des collations au courant de la journée -J'ai fait de meilleures combinaisons alimentaires pour mes collations - Le matin lorsque je travail je prends moins de collation, juste une seul mais plus nourrissante (yogourt grec avec graines de chanvres, fruits gelés et sirop d'érable. Comme exemple avant à mon autre travail je prenais un yogourt du commerce, un fruit, une barre tendre (maison ou du commerce) répartie sur une période de 2 hres (parfois je pense que je mangeais aussi des noix) . Maintenant je prends un yogourt grec nature avec les fruits congelé. -je prend une collation l'avant-midi et l'après midi - Au travail surtout, ajout de collations équilibrées entre les repas -Je prends maintenant le temps de manger le petit déjeuner	**Prise de collations:** -J'ai toujours des fruits et des légumes en collation au lieu de chocolat ou pouding ou chips.	**5**	**1**

ainsi que le dîner et des collations, chose que je ne mangeais pas souvent avant			
Se priver : -je résiste la plus part du temps car j'ai des enfants et un chum qui aime bien les chips	**Se priver :** -je me prive encore plus lorsque mon conjoint sort les chips, chocolats	**1**	**1**
Substitution/ réduction/ augmentation de produits axés sur un nutriment : **Moins de d'aliments sucrés (2) :** -Élimination des sucres raffinés (presque). Je me permet un dessert et une portion de popcorn par semaine - réduction importante des aliments contenant du sucre **Moins d'aliments gras (3):** -Le déjeuner, moins d'aliments gras comme par exemple croissant avec du fromage. -Diminution des gras -je mange que du fromage faible en gras **Plus de protéine (3) :** -J'ai augmenté le nombre de protéines -J'ai augmenté ma quantité de protéine au déjeuner. -ajout des aliments contenant des protéines **Plus de fibres (1):** -j'ai augmenté ma consommation de les aliments riches en fibres..		**9**	**0**
Plus d'aliments nutritifs : - J'ai remplacé certaines portions de lait par boisson au lait d'amandes....		**1**	**0**
Équilibrer les repas: -Je fais attention lors du portionnement des assiettes. Je		**4**	**0**

tente le plus souvent possible de respecter 1/2 légumes, 1/4 protéines 1/4 glucides. -de bien m'assurer d'avoir légumes,protéines,céréaliers. -J'essai autant que possible d'y inclure protéine, légumes et féculent. -Je m'assure de consommée tout les aliments nécessaire pour chaque repas			
Déjeuner et dîner : -Je prends maintenant le temps de manger le petit déjeuner ainsi que le dîner et des collations, chose que je ne mangeais pas souvent avant		**1**	**0**
Compenser en exercice pour manger plus : -je brûle à tous les jours minimum 300 calories avec mon bicycle stationnaire ça me donne droit à une petite collation supplémentaire a l'occasion		**1**	**0**
Diminuer la consommation d'alcool (1): - pas d'alcool (au 1 verre au minimum pour une occasion spéciale		**1**	**0**
	Ne pas sauter de repas : -J'ai pris conscience que je ne mangeais pas mes trois repas par jour, ni de collations alors je fais des efforts pour ne pas sauter de repas.	**0**	**1**
	Grignoter moins après souper : - je grignotte moins le soir après souper.	**0**	**1**
	Manger plus lentement : -Je mange plus	**0**	**1**

	lentement. Je prends le temps de respirer et déposer ma fourchette.		
	Augmenter la consommation de grignotines (2): -Par contre, depuis quelque temps, je me laisse beaucoup aller dans ma consommation de friandises -j'ai recommencé à manger des desserts	**0**	**2**
	Plus de restaurants: -Cependant j'ai abandonné ces habitudes, recommencé à manger plusieurs fois par semaine au restaurant -Plus de resto.	**0**	**2**
	Aucun changements (1) : -Aucun et c'est la mon problème, diminuer mes quantité	**0**	**1**
	Non maintien des changements : -comme je ne maintient jamais la cadence, j'en ai repris et je suis rendue à 205lbs		**1**
	Aucun légumes : je ne mange jamais de crudités, ni légumes.		**1**
	Stratégies délaissées par les re-gainers : **Compter les calories (2):** -Lors de mon processus de perte de poids, je calculais le nombre de calories que j'ingurgitais par jour avec l'aide de l'application ''My Fitness		

	Pal''. - Je calculais mes calories consommées de façon quotidienne, me maintenant entre 1200 Et 1500 calories. **Journal alimentaire :** -Lors de mon processus de perte de poids, je calculais le nombre de calories que j'ingurgitais par jour avec l'aide de l'application ''My Fitness Pal''. **Réduire les portions de féculents:** -J'avais beaucoup réduit ma consommation de pain/pâtes/patates/riz. **Se priver :** -J'ai aussi beaucoup de misère à me contrôler lorsque je mange des croustilles. J'ai réussi à beaucoup réduire ma consommation de croustilles et je m'étais même donné un objectif de 2 mois sans en manger. J'ai dépassé mon objectif et j'ai réussi à ne pas en manger du tout pendant près de 3 mois. **Éviter les restaurants :** -Lors de ma perte de poids, j'évitais les restaurants et les aliments vides. **Éviter les aliments vides :** -Lors de ma perte de poids, j'évitais les restaurants et les		

	aliments vides. **Manger des aliments à faible densité énergétique** : -J'ai été plusieurs mois à manger principalement des soupes et des salades, que j'apprécie encore ce jour.		
	Plus de féculents (1): -Par contre, depuis quelque temps, je me laisse beaucoup aller dans ma consommation de féculents	**0**	**1**
	Ne pas équilibrer les portions - Cependant j'ai abandonné ces habitudes, recommencé et ne plus équilibrer mes portions	**0**	**1**

QUESTION 3: Quels sont les principaux changements que vous avez apportés à vos **habitudes culinaires**? (par exemple, prendre plus ou moins de temps à cuisiner des repas, etc.)

MAINTAINERS	**REGAINERS**	**Segments/ quotes**	
		Maintainers	**Re-gainers**
Cuisiner plus : -Cuisiner, en congé sabbatique, j'avais du temps. -Je cuisine maintenant toutes les barres tendres, biscuits, muffins etc. Je cuisinais déjà beaucoup pour les repas principaux, par contre je fais plus attention aux ingrédients que j'ajoute. -Je me suis mise à cuisiner mes repas à toutes les semaines, alors que je cuisinais très peu avant. -Donc maintenant ça me	**Cuisine plus:** -Puisque je suis en congé je peux faire plus de repas qu'avant. -Je cuisine plus. -Je prends plus de temps pour cuisiner pour éviter la malbouffe. -J'essaie le plus possible encore et toujours de cuisiner mes repas. -Prendre plus de temps à cuisiné, -je cuisine un peu plus -je regarde plus les recettes, j'essaie de nouvelles recettes (smooties avec protéines + met asiatique j'en parle à	**11**	**7**

prend plus de mon temps dans la cuisine à tout préparer. -Je cuisine moi-même mes barres tendre maison mais j'avais commencé à le faire avant. -plus cuisiner prendre le temps -je cuisine plus -Je prends plus de temps pour choisir les recettes et cuisiner -prise des repas à la maison- meilleur contrôle sur pour le contenu de l'assiette -Surtout pour le travail, je préparais mes salades et mes collations, donc je n'étais pas "tentée" par des collations non santé. -J'ai préparé plus souvent des crudités pour les repas et les collations.	mes amies et on partage.		
Planification des repas ou préparation à l'avance: -Surtout, j'avais du temps pour penser à ce que je voulais manger. Je pouvais planifier les repas plus facilement, pas de rush. -Je planifie mes repas d'avance -Planifier plus les repas -J'écris mon menu pour la semaine et prévois des collations. -plus de temps pour la planification des repas du soir;	**Planification des repas ou préparation à l'avance:** -on essai de planifier du lundi ou jeudi les repas de la semaine à l'avance. -Je cuisine de plus grosses portions pour en n'avoir le lendemain pour mon dîner au travail.	**8**	**2**

-faire une plus grande quantité pour des restes. -Je fais cuire mes légumes pour la semaine en une seule fois. -prépare des collations santé d'avance, donc prêt pour la boite à lunch.			
Substituer/ réduire un ingrédient culinaire: -remplacé la margarine par de l'huile d'olives... -Moins de sel, moins de beurre, moins d'huile -diminué les portions de sucre dans toutes les recettes..j'allège avec compote aux pommes ex:dans les muffins... -Je cuisine maintenant toutes les barres tendres, biscuits, muffins etc. Je cuisinais déjà beaucoup pour les repas principaux, par contre je fais plus attention aux ingrédients que j'ajoute. -Je remplace par ce qui est moins gras (exemple pour remplacer l'huile dans mes gâteaux je met de la compote de pommes non sucré)	**Substituer/ réduire un ingrédient culinaire:** -On a acheté de meilleurs chaudrons te poêlons donc on utilise beaucoup moins de corps gras beurre ou huile d'olive dans la cuisson et l'huile d'olive à remplacer 80% du beurre. -Je fais également mes collations pour pouvoir réduire en sucre	**5**	**2**
Cuisine plus simple et rapide : - réduction du temps de préparation pas de sauce, beaucoup aliment sans cuisson ou au four al dente - Cuisine simple et rapide avec des aliments frais		**2**	**0**

Cuisiner avec plus d'aliments frais et minimalement transformés ou plus «santé»: -J'ai changé le spaghetti pour la courge à spagetti avec sauce aux lentilles -Je fais ma pizza avec un tortilla, pesto, légumes et fromage. -J'ai ajouté graines de chia à plusieurs aliments.. -recettes plus équilibrées, choix santé. -cuisine plus le tofu..	**Cuisiner avec plus d'aliments frais et minimalement transformés ou plus «santé»:** - l'hiver je fais beaucoup de potage de légumes, soupes asiatiques et soupes repas. -Je cuisinais beaucoup, mais maintenant je cuisine plus de légumes	**5**	**2**
Cuisiner moins de féculents : - Je cuisine moins de pâtes. -J'ai changé le spaghetti pour la courge à spagetti avec sauce aux lentilles	**Cuisiner moins de féculents :** -faire plus attention avec les féculents.	**2**	**1**
Cuisiner moins de dessert: -Je fais rarement un dessert		**1**	**0**
	Ne pas planifier un menu à l'avance : -Je ne prend pas assez le temps de préparer à l'avance.	**0**	**1**
	Aucun changement : -Je n'ai pas vraiment fais de changement car j'ai toujours pris soin de cuisiner de bons repas. -Mon problème est que j'ai de bonnes intentions mais aucune volonté ! 😔. Depuis la ménopause, il est rare que je dorme 8hres par nuit, je suis donc souvent fatiguée et après ma journée de travail, je n'ai pas le goût de faire à manger.	**0**	**2**

	Conjoint qui cuisine - Cependant, ces derniers temps, je vis des choses pas plaisantes personnellement et professionnellement et je ne suis pas dans une bonne passe émotionnelle. C'est donc mon conjoint qui cuisine la plupart du temps.	0	**1**

QUESTION 4 : Qu'avez-vous modifié dans **l'environnement alimentaire** de votre maison? (par exemple, ranger les grignotines dans l'armoire plutôt que de les laisser sur la table ou à la vue, exposer un plat de crudités sur la table plus fréquemment, etc.).

MAINTAINERS	REGAINERS	Segments/ quotes	
		Maintainers	Re-gainers
Plus de fruits et légumes : -J'ai toujours un plat de légumes, crudité, coupés et lavés dans le frigo -Lors des soupers, des crudités ou une salade accompagne le repas. Avec les vacances, j'ai relâché un peu et ma fille l'autre jour m'a dit qu'elle s'ennuyait des légumes. -J'ai tjrs des légumes dans le frigidaire -Il y a toujours des concombres, céleri, carottes, champignons et poivrons. -Dans le frigo j'ai toujours des céleris et carottes déjà coupées et une trempette maison a base de yogourt nature. -Un plateau de fruits facilement accessible par tous sur le comptoir. - tjrs des fruit dans le frigidaire - J'ai toujours des fruits sur mon comptoir	**Plus de fruits et légumes :** -Garder des légumes lavés, coupés en quantité… facile à mettre dans les lunchs et pour les fringales! -J'ai acheté un charriot roulant qui Est dans la salle à manger et que je remplis des fruits et légumes. Ils sont ainsi facilement accessibles et tout le monde de la famille en mange davantage depuis! -On fait plus souvent de plats de crudité au frigo -J'ai acheté un charriot roulant qui Est dans la salle à manger et que je remplis des fruits -Ce qui traine sur le comptoir c'est un plat de fruits. -On a un bol de fruits à vue pour quand j'ai faim	**8**	**6**
Éliminer/ limiter les achats de grignotines: -Pour ce qui est des grignotines je tente d'en acheter le moins souvent possible, que pour de rares occasions car sinon je sais que je vais en manger... -Je n'achète presque plus de grignotines, alors les tentations ne sont plus à la maison. -Je garde le moins possible de tentations dans l'armoire	**Éliminer/ limiter les achats de grignotines:** -Je n'achète plus de cochonneries -Je n'achète pas de grignotines régulièrement -J'achète beaucoup moins de chips, desserts justement pour éviter de vouloir en manger -Nous essayons, mon conjoint et moi, de ne plus	**9**	**7**

-achat grigotines que dans les occasions pour les enfants lors des visites; -je n'achète plus de sacs de chips régulièrement comme dans l'an passé - J'achète moins de grignotines -Aucun achat de choses que je ne devais pas manger tel que le Fromage en grains et chocolat. -Aucun achat de choses que je ne devais pas manger tel que le Fromage en grains et chocolat. - ménage complet du garde manger: plus de bonbons, croustilles ou autres à la maison;	acheter de friandises. -Je n'achète pas de cochonneries, alors moins tentant d'en manger -plus de chip biscuit sucrerie. -J'achète pu de bonbons ou très peu.		
Cacher les grignotines: - J'ai fait un grand nettoyage dans mes armoires et frigidaire tout enlever les grignotines et les placer tout au fond d'un armoire et tout remplacer par des fruits, légumes, yogourt, fromage et bar nutritives à base calories et céréales ainsi que des noix. Comme ça quand on ouvre le frigidaire ou les armoires on y retrouve que des aliments nutritive et sur le comptoir évidemment. -je n'achète plus de sacs de chips régulièrement comme dans l'an passé si j'en achète, je le cache… -J'ai toujours des amandes ou noix pour les collations. Celles-ci sont bien rangées... Quand j'en apporte (en sortie plein air ou au travail), je les compte! Je n'apporte jamais le sac complet comme je pouvais le faire auparavant! - J'ai fait un grand nettoyage dans mes armoires et frigidaire tout enlever les grignotines et les placer tout au fond d'un	**Cacher les grignotines :** -J'achète beaucoup moins de chips, desserts justement pour éviter de vouloir en manger. Ce que j'achète est rangé dans l'armoire - Je n'achète plus de cochonneries et si mon conjoint en achète il les cache pour ne pas que je devienne completement folle. - Nous essayons, mon conjoint et moi, de ne plus acheter de friandises. S'il y en a dans la maison, nous les rangeons et les cachons le plus possible pour les oublier et ne plus y penser - Mon chum cache les chips pour pas que je les atteigne dans l'armoire du haut. -Maintenant, la famille veulent avoir grignotines vont les chercher eux même (achats) ce n,ai plus moi, chocolat crème glacé, etc. comme ça je ne sais pas - C'est certain que les grignotines sont dans	**4**	**6**

armoire et tout remplacer par des fruits, légumes, yogourt, fromage et bar nutritives à base calories et céréales ainsi que des noix. Comme ça quand on ouvre le frigidaire ou les armoires on y retrouve que des aliments nutritive et sur le comptoir évidemment.	l'armoire		
Aucun: -Rien de spécial -Je n'ai pas fait de changements. -aucuns changement de ce côté	**Aucun** Rien	**3**	**1**
	Réaménager le garde-manger et substituer les grignotines pour des aliments plus nutritifs (1): -dans le garde manger il est mieux aménager et j'ai de nouvelles aliments plus santé	**0**	**1**
Laisser de l'eau à la vue: - Laisse traîner une bouteille d'eau sur le comptoir car j'ai jamais soif.. -Je bois plus d'eau et laisse un verre d'eau toujours prêt à boire		**2**	0

Annex IV - Codification

Question 1: Décrivez à quoi ressemble votre assiette typique en terme de portions et de choix alimentaires (proportion de viande et substituts, produits céréaliers, fruits et légumes, gras)

Catégorie	Définition	Inclusion/ exclusion	Exemples
Assiette équilibrée selon le GAC	Assiette bien manger pour créer un repas santé selon le guide alimentaire canadien. Demie-assiette en légumes, quart en viande et substituts et un quart de produits céréaliers.	Inclusion : Demie-assiette en légumes ou au moins 1 tasse de légumes ou fruits. Viandes et substituts portion de 3oz ou plus par repas ou équivalence de la paume de la main. Produits céréaliers mentionné «parfois absent» par le participant.	-3 oz de viande + 0.5 tasse en produits céréaliers et demie-assiette de légumes -100g de viande et substituts+ 1 tasse de légumes et parfois un produits céréaliers (¼ de l'assiette)
Assiette de légumes + viande et substituts	Assiette contenant seulement des légumes et une portion de viande et subsituts.	Exclusion : assiette contenant des produits céréaliers	-légumes au moins 1 tasse + 5 oz de viande ou poisson -moitié légume (2 tasses) et moitié viande et substituts (2 jeux de carte) **le midi** et idem le soir mais avec ¼ de l'assiette en féculent (0.5 tasse)
Assiette sans légumes	Assiette contenant aucun légume ou très peu, une portion de produits céréaliers et une autre de viande et substituts ou de fromage	Inclusion : Assiette contenant aucun légume ou apport en légumes non-mentionné par le participant. Repas de pâtes pré-préparés.	-4oz de viande + 1 tasse de riz (ou beaucoup de pâtes), et 0.5 tasse de légumes ou parfois pas de légumes -beaucoup de pâtes pré-préparés, lasagne, riz minute + fromage

QUESTION 1 : Quels sont les principaux changements que vous avez apportés à votre panier d'épicerie (à vos achats alimentaires)?

Catégorie	Définition	Critères d'inclusion/ exclusion	Exemples
Augmentation de l'achat de produits frais ou minimalement transformés	Augmentation dans l'achat de produits frais ou minimalement transformés identifiés selon la classification NOVA tels que les fruits et légumes, le poisson, la volaille, etc.	Inclusion: Version/variété du produit non-spécifié par le participant. Par exemple les noix peuvent être salées ou non, mais si le mot salé n'a pas été spécifié, l'aliment a été considéré comme un aliment minimalement transformé.	-noix -j'ai ajouté du yogourt grec nature
Changer la fréquence ou la méthode de faire l'épicerie	Changement dans la fréquence ou dans la méthode de faire l'épicerie.		-Va à l'épicerie 2 a 3 fois par semaine à la place d'un seul panier bondé.... - J'évite les allées centrales de l'épicerie
Moins d'achats d'aliments transformés	Réduction de l'achat des produits ultra-transformés identifiés selon la classification NOVA tels que les croustilles, les boissons sucrées, etc.	Exclusion : Les changements visant les produits ultra-transformés reformulés au niveau des nutriments (réduits en sel, sucre et/ou gras) tel qu'opter pour un produit faible en gras ou en sucre.	-J'ai réduit l'achat de chips -beaucoup moins de liqueur.
Réduire/ substituer/ augmenter l'achat d'un produit reformulé au niveau des nutriments	Réduire/ substituer/ augmenter l'achat d'un produit en fonction de sa composition nutritionnel (sucres simples, lipides, protéine, sodium ou fibres) comme par exemple opter pour une version faible en sucre, en sodium ou en gras, ou riche en protéine.	Exclusion: Produits ultra-transformés identifiés selon la classification NOVA ne visant pas un nutriment en particulier tel que les croustilles, les boissons gazeuses, les biscuits, etc.	-J'essaie de choisir les aliments avec moins ou pas de sucre. -Je n'achète plus, fromages gras
Lecture des étiquettes nutritionnelles	Choisir un produit en fonction de		-Je compare les valeurs nutritives de

	l'étiquetage nutritionnel en regardant soit le tableau de valeur nutritive ou la liste des ingrédients		tous les aliments achetés - je fais plus attention aux étiquettes.
Moins de viande rouges	Réduction de l'achat de la viande rouge		-moins de viandes rouges. -Moins de viande rouge (Au moins 3 repas de viande rouge de moins
Substitution/réduction des produits céréaliers raffinés pour des grains entiers	Réduire l'achat de produits céréaliers raffinés et/ou augmenter l'achat de produits céréaliers de grains entiers.		-je n'achète plus: Pains blancs et pâtes blanches ajouté des triscuits. - je mange des pâtes de blé entier
Acheter un format plus petit d'un produit	Opter pour un format réduit d'un produit.		Aussi, j'étais du genre à m'acheter un gros sac de croustilles et de passer au travers en 2 jours. Maintenant, lorsque j'ai envie d'en manger, je m'achète un petit sac et je me contente de ça
Achat d'aliments plus nutritifs	Opter pour des choix d'aliments plus nutritif à l'épicerie.	Inclusion : exemples d'aliments nutritifs non détaillés par le participant.	J'achète beaucoup plus d'aliments nutritifs
Aucun changements	Aucun changement fait en lien avec les achats faits à l'épicerie		Aucun, mes aliments sont de bons choix généralement
Plus d'achat de mets transformés 'faits maison' ou 'santé'	Augmentation d'achats des mets transformés ou ultra-transformés tel que les mets surgelés ou pré-préparés.		Avant je travaillais à l'hôpital et je prenais mon dîner à la cafétéria, (très bons repas) mais depuis plus de 2 ans, je travaille toujours au CISSSL, mais dans une bâtisse sans cafétéria, donc le midi c'est Cuisine minceur
Moins d'aliments à	Réduction de l'achat		- Et achète rien à frire

frire	d'aliments à frire		on c débarrassé de la friteuse.

QUESTION 2 : Quels sont les principaux changements que vous avez apportés à votre consommation alimentaire?

Catégorie	Définition	Critères d'inclusion/ exclusion	Exemples
Consommer moins d'aliments transformés	Réduction dans la consommation de produits ultra-transformés identifiés selon la classification NOVA.	Inclusion : exemples de produits transformés non cités par le participant. Exclusion : Les changements visant les produits ultra-transformés reformulés au niveau des nutriments (réduits en sel, sucre et/ou gras).	-Moins de charcuteries -j'ai arrêter de consommer plusieurs produits transformés - j'ai beaucoup diminuer les boissons gazeuses
Moins de restaurants	Diminuer la fréquence de consommation au restaurants	Inclusion : Tous les types de restaurants (fastfood, sushis, traditionnels).	-sushis..va moins au resto
Augmenter la consommation d'aliments frais ou minimalement transformés	Augmentation dans la consommation d'aliments frais ou minimalement transformés identifiés selon la classification NOVA tels que les fruits et légumes, le poisson, la volaille, etc.		-J'ai augmenté ma quantité de légumes au dîner (salade)... - J'ai augmenté ma consommation de poisson
Boire plus d'eau	Augmenter la consommation d'eau		-Boire de l'eau plus souvent - J'essaye de boire plus d'eau.
Faire ses lunchs	Augmentation dans la consommation de lunchs préparés maison		-Je fais toujours mes lunchs que j'apporte au travail.
Manger à des heures régulières	Manger à des heures plus régulières		- J'ai mangé à des heures fixes - je fais des efforts pour manger à des heures plus régulières
Réduire les portions	Réduction des portions	Inclusion : Équilibre	-je n'achète plus des

	consommées	des portions	gros gâteaux, mais plutôt des petits cakes de temps en temps - J'ai réduit mes portions
Plus grosses portions	Augmentation des portions consommées.		- Cependant j'ai abandonné ces habitudes, recommencé et ne plus équilibrer mes portions
Moins de produits céréaliers.	Réduction de la consommation de produits céréaliers.	Les carbohydrates, les féculents, les produits céréaliers, les “p”.	-j’ai réduit le nombre de carbohydrates. - moins de "p"
Augmentation de la consommation des grains entiers	Augmentation de la consommation de produits céréaliers entiers	Grains entiers tels que les pâtes de blé entiers, le pain de grains entiers, etc.	-je mange des pâtes de blé entier
Plus de féculents	Augmentation de la consommation de féculents/ produits céréaliers		-Par contre, depuis quelque temps, je me laisse beaucoup aller dans ma consommation de féculents
Ne pas manger à certaines heures	S’abstenir de manger à certaines heures.		-cessation de manger entre les repas ou en soirée -Bref, j'ai quand même arrêter de manger après 19h max
Prise de collations	Consommation de collations	Tous types de collations incluant les collations équilibrées ou non spécifiées par le participant.	-J'ai fait de meilleures combinaisons alimentaires pour mes collations --J'ai toujours des fruits et des légumes en collation au lieu de chocolat ou pouding ou chips.
Se priver	S’abstenir de consommer certains aliments.		-je résiste la plus part du temps car j’ai des enfants et un chum qui aime bien les chips

			- je me prive encore plus lorsque mon conjoint sort les chips , chocolats
Substitution/ réduction/ augmentation de produits axés sur un nutriment	Substituer/ réduire/ augmenter la consommation de certains aliments en fonction de la composition nutritionnel tel que choisir des aliments faibles en sucre, en sodium ou en gras, ou encore des aliments à plus haute teneur en protéine ou en fibres.	Produits visant les produits transformés ou ultra-transformés reformulés au niveau des nutriments: sucre, sel et/ou gras, protéines ou fibres. produits ultra-transformés identifiés selon la classification NOVA, comme les croustilles, les boissons gazeuses, les biscuits, etc. sans viser un nutriment en particulier.	-j'ai augmenté ma consommation de les aliments riches en fibres.. -J'ai augmenté le nombre de protéines -je mange que du fromage faible en gras
Manger plus lentement	Prendre plus de temps pour manger		Je mange plus lentement. Je prends le temps de respirer et déposer ma fourchette.
Équilibrer les repas	Équilibrer les repas en suivant les recommandations du guide alimentaire Canadien (moitié de l'assiette de légumes, ¼ de produits céréaliers et ¼ de viandes et substituts)	Inclusion : Ratio de l'assiette ou des groupes alimentaires non-cité par le participant.	- J'essai autant que possible d'y inclure protéine, légumes et féculent. - Je m'assure de consommée tout les aliments nécessaire pour chaque repas
Augmenter la consommation de grignotines	Augmentation dans la consommation de friandises		-j'ai recommencé à manger des desserts
Déjeuner et dîner	Consommer un déjeuner et un dîner.		Je prends maintenant le temps de manger le petit déjeuner ainsi que le dîner et des collations, chose que je ne mangeais pas souvent avant
Plus de restaurants	Augmenter la fréquence de		-Plus de resto. - Cependant j'ai

	consommation au restaurant		abandonné ces habitudes, recommencé à manger plusieurs fois par semaine au restaurant
Compenser en exercice pour manger plus	Dépenser de l'énergie en s'entraînant afin de se permettre de consommer cette énergie en nourriture		-je brûle à tous les jours minimum 300 calories avec mon bicycle stationnaire ça me donne droit à une petite collation supplémentaire a l'occasion
Aucun changements	Aucun changement fait en lien avec sa consommation alimentaire		Aucun et c'est la mon problème, diminuer mes quantité
Diminuer la consommation d'alcool	Diminuer ou limiter la consommation d'alcool		pas d'alcool (au 1 verre au minimum pour une occasion spéciale
Ne pas sauter de repas	Manger ses trois repas par jour de façon consistante sans sauter un repas.		-J'ai pris conscience que je ne mangeais pas mes trois repas par jour, ni de collations alors je fais des efforts pour ne pas sauter de repas.
Plus d'aliments nutritifs	Augmenter la consommation d'aliments nutritifs **selon le participant.**		- J'ai remplacé certaines portions de lait par boisson au lait d'amandes....
Grignoter moins après souper	Manger moins de grignotines après l'heure du souper		- je grignote moins le soir après souper.
Non maintien des changements	Ne pas maintenir les changements alimentaires faits.		comme je ne maintient jamais la cadence, j'en ai repris et je suis rendue à 205lbs
Aucun légumes	Aucune consommation de légumes.		je ne mange jamais de crudités, ni légumes

***Stratégies délaissées par les regainers lors de la perte de poids :**

Catégorie	**Définition**	**Exemples**
Compter les calories	Compter les calories consommées sur une base quotidienne.	-Lors de mon processus de perte de poids, je calculais le nombre de calories que j'ingurgitais par jour avec l'aide de l'application ''My Fitness Pal''.
Journal alimentaire	Écrire les aliments consommés	-Lors de mon processus de perte de poids, je calculais le nombre de calories que j'ingurgitais par jour avec l'aide de l'application ''My Fitness Pal''.
Réduire les portions de féculents	Réduire les portions de féculents consommées	-J'avais beaucoup réduit ma consommation de pain/pâtes/patates/riz.
Se priver	S'abstenir de manger certains aliments	-J'ai aussi beaucoup de misère à me contrôler lorsque je mange des croustilles. J'ai réussi à beaucoup réduire ma consommation de croustilles et je m'étais même donné un objectif de 2 mois sans en manger. J'ai dépassé mon objectif et j'ai réussi à ne pas en manger du tout pendant près de 3 mois.
Éviter les restaurants	Réduire la fréquence de consommation au restaurant	-Lors de ma perte de poids, j'évitais les restaurants et les aliments vides.
Éviter les aliments vides	Éviter de consommer des aliments vides, soit des aliments qui apportent des calories mais qui n'ont aucune valeur nutritive ou une valeur nutritive très faible tels que les bonbons, les boissons gazeuses, etc.	-Lors de ma perte de poids, j'évitais les restaurants et les aliments vides.
Manger des aliments à faible densité énergétique	Manger des aliments à faible densité énergétique, soit des	-J'ai été plusieurs mois à manger principalement

	aliments qui contiennent relativement peu de calories par rapport à leur volume.	des soupes et des salades, que j'apprécie encore ce jour.

*Les stratégies utilisées par les regainers pour perdre du poids n'ont pas été demandées, mais certains l'ont quand même mentionné suite à la question 2.

**Motif de la perte de poids

Catégorie	**Définition**	**Exemples**
Faire des changements pour éviter la prise de médicaments	Vouloir faire des modifications dans les habitudes alimentaires afin d'éviter la prise d'un médicament (pour des raisons médicales).	-En fait, en octobre dernier j'ai passé des tests parce que j'avais des reflux, je pesais alors 217lbs. J'ai appris alors que j'avais une hernie hiatale, j'ai donc fait des changements puisque je ne voulais pas prendre des médicaments indéfiniment et j'ai perdu 17lbs mais, comme je ne maintient jamais la cadence, j'en ai repris et je suis rendue à 205lbs.

**Les motifs pour la perte de poids n'ont pas été demandées, mais certains l'ont quand même cité.

QUESTION 3: Quels sont les principaux changements que vous avez apportés à vos habitudes culinaires?

Catégorie	**Définition**	**Critères d'inclusion**	**Exemples**
Cuisiner plus	Augmenter la fréquence de cuisiner ou le temps consacré à cuisiner un repas ou une collation.	Inclusion : -Fréquence de cuisiner les repas, les collations ou le temps consacré à la préparation d'un repas ou d'une collation - Cuisiner de nouvelles recettes	-Je cuisine maintenant toutes les barres tendres, biscuits, muffins etc. Je cuisinais déjà beaucoup pour les repas principaux, par contre je fais plus attention aux ingrédients que j'ajoute -Prendre plus de temps à cuisiné
Planification des repas	Planifier les repas ou les collations.	Inclusion : Écrire un menu pour la semaine, prévoir les collations ou les repas.	-J'écris mon menu pour la semaine et prévois des collations. -on essai de planifier du lundi ou jeudi les repas de la semaine à

			l'avance.
Préparer d'avance les repas/ collations	Préparer les repas à l'avance.	Inclusion: Préparer des repas ou des aliments pour la semaine, pour le lendemain, pour les lunchs ou pour des restants.	-faire une plus grande quantité pour des restes. -Je cuisine de plus grosses portions pour en n'avoir le lendemain pour mon dîner au travail.
Substituer ou réduire un ingrédient culinaire	Substituer un ingrédient culinaire par un autre ou réduire la quantité utilisée d'un ingrédient culinaire identifiés selon la classification NOVA tel que le sel, le sucre de table, les huiles végétales, le beurre, etc.	Inclusion : -Margarine (utilisé comme ingrédient culinaire, mais classé comme un ingrédient ultra-transformé selon NOVA) -Exemple d'ingrédient culinaire non cité par le participant.	-Moins de sel, moins de beurre, moins d'huile -Je cuisine maintenant toutes les barres tendres, biscuits, muffins etc. Je cuisinais déjà beaucoup pour les repas principaux, par contre je fais plus attention aux ingrédients que j'ajoute.
Cuisine plus simple et rapide	Cuisiner des recettes plus rapidement et des recettes simples	Inclusion : Cuisine simple et rapide, temps de préparation non-mentionné par le participant ou exemple de repas simple non-mentionné	- Cuisine simple et rapide avec des aliments frais
Cuisiner avec plus d'aliments frais et minimalement transformés ou plus «santé»	Cuisiner des recettes avec des ingrédients frais ou minimalement transformés identifiés selon la classification NOVA ou avec des ingrédients plus «santé» non identifié.	Inclusion : -Des ingrédients plus «santé» sans exemples mentionnés par le participant.	-recettes plus équilibrées, choix santé. -Je fais ma pizza avec un tortilla, pesto, légumes et fromage.
Cuisiner moins de féculents	Cuisiner moins de produits céréaliers	Inclusion : - faire «plus attention» avec les féculents.	- Je cuisine moins de pâtes. -faire plus attention avec les féculents.
Cuisiner moins de	Cuisiner moins de		Je fais rarement un

dessert	dessert		dessert
Ne pas planifier un menu à l'avance	Ne pas prendre le temps de planifier ses repas/ collations à l'avance		-Je ne prend pas assez le temps de préparer à l'avance.
Aucun changement	Faire aucun changement en lien avec les habitudes culinaires		-Je n'ai pas vraiment fais de changement car j'ai toujours pris soin de cuisiner de bons repas. -Mon problème est que j'ai de bonnes intentions mais aucune volonté.
Conjoint qui cuisine	Conjoint de la participante qui cuisine		. C'est donc mon conjoint qui cuisine la plupart du temps

Question 4 : Qu'avez-vous modifié dans l'environnement alimentaire de votre maison?

Catégorie	Définition	Critères d'inclusion	Exemples
Plus de fruits et légumes	Avoir plus de légumes ou de fruits dans le frigidaire, sur la table ou sur le comptoir, soit prêt-à-manger et/ou plus facilement accessible.	Inclusion : Avoir plus de fruits ou légumes dans le frigo (non-mentionné s'ils sont prêt-à-manger).	-J'ai toujours un plat de légumes, crudité, coupés et lavés dans le frigo -Garder des légumes lavés, coupés en quantité… facile à mettre dans les lunchs et pour les fringales!
Éliminer/ limiter les achats de grignotines	Ne pas conserver de grignotines chez soi ou du moins, le moins souvent possible.		-Je garde le moins possible de tentations dans l'armoire -Je n'achète pas de cochonneries, alors moins tentant d'en manger
Cacher les grignotines	Cacher les grignotines à un endroit moins facilement visible ou accessible		-je n'achète plus de sacs de chips régulièrement comme dans l'an passé si j'en achète, je le cache… - Mon chum cache les chips pour pas que je les atteigne dans l'armoire du haut.
Aucun	Aucuns changements faits dans l'environnement alimentaire de la maison.		-Rien de spécial
Réaménager le garde-manger et substituer les grignotines pour des aliments plus nutritifs	Réaménager le garde-manger de façon à rendre plus facilement accessible et visible les aliments frais et minimalement transformés et rendre les aliments ultra-transformés (aliments identifiés selon la classification NOVA)	Inclusion : Des ingrédients plus «santé» sans exemples mentionnés par le participant.	- J'ai fait un grand nettoyage dans mes armoires et frigidaire tout enlever les grignotines et les placer tout au fond d'un armoire et tout remplacer par des fruits, légumes, yogourt, fromage et bar nutritives à base

	moins accessible et visible.		calories et céréales ainsi que des noix. Comme ça quand on ouvre le frigidaire ou les armoires on y retrouve que des aliments nutritive et sur le comptoir évidemment. - dans le garde manger il est mieux aménager et j'ai de nouvelles aliments plus santé
Laisser de l'eau à la vue	Laisser de l'eau à la vue et plus facilement accessible		- Laisse traîner une bouteille d'eau sur le comptoir car j'ai jamais soif..

Annex V – Certificat d'approbation éthique

Université de Montréal

Comité d'éthique de la recherche en santé

N^O de certificat
17-046-CERES-D(1)

CERTIFICAT D'APPROBATION ÉTHIQUE

- 1er renouvellement -

Le Comité d'éthique de la recherche en santé (CERES), selon les procédures en vigueur et en vertu des documents relatifs au suivi qui lui a été fournis conclu qu'il respecte les règles d'éthique énoncées dans la Politique sur la recherche avec des êtres humains *de l'Université de Montréal*

Projet	
Titre du projet	**Stratégies alimentaires et défis associés à la perte de poids à long terme chez les femmes adultes québécoises en surplus de poids**
Étudiante requérante	**Karine Séguin** (ND), Candidate à la M. Sc. en nutrition, Faculté de médecine - Département de nutrition
Sous la direction de	Jean-Claude Moubarac, professeur adjoint, Faculté de médecine - Département de nutrition, Université de Montréal

Financement	
Organisme	Non financé
Programme	
Titre de l'octroi si différent	
Numéro d'octroi	
Chercheur principal	
No de compte	

MODALITÉS D'APPLICATION

Tout changement anticipé au protocole de recherche doit être communiqué au CERES qui en évaluera l'impact au chapitre de l'éthique. Toute interruption prématurée du projet ou tout incident grave doit être immédiatement signalé au CERES.

Selon les règles universitaires en vigueur, un suivi annuel est minimalement exigé pour maintenir la validité de la présente approbation éthique, et ce, jusqu'à la fin du projet. Le questionnaire de suivi est disponible sur la page web du CERES.

Guillaume Paré
Conseiller en éthique de la recherche.
Comité d'éthique de la recherche en santé
Université de Montréal

4 juin 2018
Date de délivrance du renouvellement ou de la réémission*

1er juillet 2019
Date du prochain suivi

9 mai 2017
Date du certificat initial

1er juillet 2019
Date de fin de validité

*Le présent renouvellement est en continuité avec le précédent certificat

Annex VI – Consent and information form

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT

TITRE DU PROJET DE RECHERCHE
Stratégies alimentaires et défis associés à la perte de poids à long terme chez les femmes adultes québécoises en surplus de poids

Étudiante-Chercheuse	**Karine Séguin** Candidate à la maîtrise en nutrition Faculté de médecine – Département de nutrition, Université de Montréal
Directeur de recherche	**Jean-Claude Moubarac** PhD, professeur adjoint Faculté de médecine – Département de nutrition, Université de Montréal

Nous vous invitons à participer au projet de recherche en titre afin d'identifier les stratégies alimentaires et les défis associés à la perte de poids à long terme chez les femmes adultes québécoises en surplus de poids dans le but d'augmenter le taux de succès de perte de poids à long terme. Avant d'accepter d'y participer, veuillez prendre le temps de lire ce document présentant les conditions de participation au projet. N'hésitez pas à poser toutes les questions que vous jugerez utiles à la personne qui vous présente ce document.

Source de financement
Ce projet ne bénéficie pas de financement.

Nature du projet de recherche

Nous vivons dans une épidémie d'obésité. Au Canada, la prévalence de l'obésité et de l'embonpoint en 2008 était de 62,1 %. L'excès de poids augmente les risques de plusieurs maladies chroniques. Perdre du poids, aussi peu que 5% du poids corporel, entraîne une réduction significative des risques pour la santé. Selon un sondage mené au Québec, 45 % des femmes font plus de deux tentatives par année pour perdre du poids et environ 20 % des personnes en surplus de poids ayant fait une tentative de perte de poids réussissent à maintenir leur perte de poids à long terme (perte de >10 % du poids corporel initial maintenu > 1 an).
L'objectif de ce projet de recherche est d'identifier les stratégies alimentaires et les défis associés à la perte de poids à long terme chez les femmes adultes

québécoises en surplus de poids afin que les professionnels de la santé puissent mieux encadrer et guider les femmes dans leurs démarches de perte de poids à long terme, et parallèlement, augmenter le taux de succès de la perte de poids à long terme, et ce, en adoptant et en adhérant à un style de vie sain à long terme.

Ce projet impliquera entre 30 à 60 femmes québécoises entre 18 et 60 ans. Les participantes seront toutes des clientes ayant été suivies pour une perte de poids avec la chercheuse Karine Séguin.

Déroulement du projet de recherche
Votre participation à ce projet de recherche consiste à participer à une entrevue en ligne (Skype ou FaceTime) ou téléphonique (selon votre préférence) avec la chercheuse Karine Séguin. Un questionnaire vous sera administré par la chercheuse et la date de l'entrevue sera fixée en fonction de vos disponibilités durant les mois de juillet à septembre 2017. La durée de l'entrevue est d'environ 60 minutes. L'entrevue ne sera pas enregistrée.

L'entrevue portera sur les thématiques suivantes :
Caractéristiques démographiques, histoire pondérale, consommation et pratiques alimentaires, environnement alimentaire et social, motivation, confiance, connaissances en nutrition, habitudes de vie, activité physique, facteurs psychologiques.

Avantages et bénéfices
La contribution à l'avancement des connaissances au sujet des stratégies alimentaires et défis associés à la perte de poids à long terme chez les femmes adultes québécoises est le bénéfice prévu.

Inconvénients et risques
Le seul inconvénient lié à votre participation est le temps consacré à la recherche, soit environ 60 minutes. Il est possible que vous ressentiez un malaise par rapport à certaines questions qui vous seront posées. Si c'est le cas, vous êtes libres de refuser de répondre à toute question et au besoin, nous pourrons vous référer à des ressources appropriées.

Confidentialité
Pour éviter votre identification comme personne participante à cette recherche, les données recueillies par cette étude seront traitées de manière entièrement confidentielle. La confidentialité sera assurée en conservant vos informations dans un fichier protégé par un code d'accès. Les résultats de la recherche ne permettront pas d'identifier les personnes participantes. Les résultats seront diffusés sous la forme d'un mémoire de maitrise déposé à l'Université de Montréal, et possiblement sous forme d'un article scientifique et lors de communications orales au département de nutrition et lors de présentations grand public.

Les données de la recherche seront conservées dans un classeur sous clé. Les seules personnes qui y auront accès sont Karine Séguin et son directeur de recherche Jean-Claude Moubarac, Professeur, PhD, Faculté de médecine, département de nutrition. Les données seront détruites sept ans après l'acceptation du mémoire et ne seront pas utilisées à d'autres fins que celles décrites dans le présent document.

Compensation financière
Aucune compensation ne sera remise.

Retour des résultats
Vous serez informé des résultats de la recherche et des publications qui en découleront, le cas échéant. Nous préserverons l'anonymat des personnes ayant participé à l'étude.

Conflit d'intérêts
La chercheuse est la nutritionniste antérieure des participantes. Il n'y a aucun conflit d'intérêt entre Jean-Claude Moubarac et ce projet de recherche.

Participation volontaire et droit de retrait

Vous êtes libre d'accepter ou de refuser de participer à ce projet de recherche. Vous pouvez vous retirer de cette étude à n'importe quel moment, sans avoir à donner de raison. Vous avez simplement à aviser la personne ressource de l'équipe de recherche, et ce, par simple avis verbal.

En cas de retrait, vous pouvez demander la destruction des données ou du matériel vous concernant. Cependant, il sera impossible de retirer vos données ou votre matériel des analyses menées une fois ces dernières publiées ou diffusées.

La participation au projet de recherche, le refus de participer ou votre retrait n'aura pas de conséquence sur les services que vous pourriez recevoir auprès de la nutritionniste Karine Séguin.

Responsabilité de l'équipe de recherche

En acceptant de participer à cette étude, vous ne renoncez à aucun de vos droits ni ne libérez les chercheurs, le commanditaire ou l'établissement de leurs responsabilités civiles et professionnelles.

Personnes-ressources

Si vous avez des questions sur les aspects scientifiques du projet de recherche, vous pouvez contacter :

Karine Séguin
Nutritionniste, Dt.P., candidate à la maîtrise
Chercheuse responsable du projet de recherche
Département de nutrition, Université de Montréal

Pour toute préoccupation sur vos droits ou sur les responsabilités des chercheurs concernant votre participation à ce projet, vous pouvez contacter le conseiller en éthique du Comité d'éthique de la recherche en santé (CERES) :
Courriel : **ceres@umontreal.ca**
Site Web : http://recherche.umontreal.ca/participants.
Toute plainte concernant cette recherche peut être adressée à l'ombudsman de l'Université de Montréal, au numéro de téléphone (514) 343-2100 ou à l'adresse courriel ombudsman@umontreal.ca. L'ombudsman accepte les appels à frais virés. Il s'exprime en français et en anglais et prend les appels entre 9 h et 17 h

Consentement

Déclaration du participant

Je comprends que je peux prendre mon temps pour réfléchir avant de donner mon accord ou non à participer à la recherche.
Je peux poser des questions à l'équipe de recherche et exiger des réponses satisfaisantes.
Je comprends qu'en participant à ce projet de recherche, je ne renonce à aucun de mes droits ni ne dégage les chercheurs de leurs responsabilités.
J'ai pris connaissance du présent formulaire d'information et de consentement et j'accepte de participer au projet de recherche.

Je consens à ce que mon dossier de nutrition soit consulté par l'équipe de recherche pendant 1 an à partir de la date de signature du consentement afin d'obtenir les données anthropométriques (poids initial et tour de taille) au jour 1 du suivi nutritionnel avec la nutritionniste antérieure Karine Séguin. Oui q Non q

Prénom et nom du participant (caractères d'imprimerie)	Signature du participant Date :

Engagement du chercheur

J’ai expliqué les conditions de participation au projet de recherche au participant. J’ai répondu au meilleur de ma connaissance aux questions posées et me suis assuré de la compréhension du participant. Je m’engage, avec l’équipe de recherche, à respecter ce qui a été convenu au présent formulaire d’information et de consentement.

Prénom et nom du chercheur (caractères d’imprimerie)	Signature du chercheur Date :